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1 JULY 1988



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# ***JPRS Report***

# **Science & Technology**

***USSR: Life Sciences***

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# Science & Technology

## USSR: Life Sciences

JPRS-ULS-88-011

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UDC 577.115 + 581.174.1

**Modification of Lipid Components of Chloroplast Membranes of Winter Wheat With Polystimulin K Under Conditions of Water Stress**

*18400274d Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 6, Feb 88 (manuscript received 8 Jul 87) pp 1513-1516*

[Article by S. V. Manuilskaya, I. A. Grigoryuk, A. I. Mikhno, M. I. Shtilman and V. V. Korshak, Institute of Plant Physiology, UkSSR Academy of Sciences, Kiev; Moscow Chemical Engineering Institute imeni D. I. Mendeleyev]

[Abstract] The search for synthetic growth regulators aimed at minimizing undesirable effects of drought, high temperature and other stresses continues to be of prime interest. The effect of a novel growth regulator, polystimulin K (PSK) on the lipid matrix of winter wheat

chloroplast thylakoids was studied under conditions of water stress, using Odesskaya 51 (drought-resistant) and Rovenskaya 49 (drought-sensitive) wheat varieties. Lipid components determine the water permeability of the membranes. The content of phosphatidylglycerine and phosphatidylcholine varies in leaves of PSK-treated and non-treated wheat. In this study PSK showed an antistress effect on experimental plants by lowering the level of phospholipid degradation in the chloroplast membranes of the drought-sensitive and -resistant varieties. PSK blocks destructive processes in lipid components of thylakoid membranes and increases the adaptability of the photosynthetic apparatus of such plants to water stress. PSK induces nonspecific reactions leading to stabilization of the lipid composition of chloroplast membranes and decreasing the destructive action of water stress. Figures 2; references 13: 6 Russian, 7 Western.

7813/7310

577.175.859'17:547.964.4.057

**Synthesis and Pharmacologic Properties of Des-9-Glycine Analogs of [Orn<sup>8</sup>]Vasopressin**

18400280a Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript  
received 21 Oct 86; in final form 20 Jan 87) pp 10-19

[Article by O.S. Papsuyevich, T. Bart\*, G.I. Chipens, V.D. Bakharev and E.A. Gaylite, Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga; \*Institute of Organic Chemistry and Biochemistry, Czechoslovak Academy of Sciences, Prague]

[Abstract] Conventional methods of peptide chemistry were employed in the synthesis of three des-9-glycine analogs of [Orn<sup>8</sup>]vasopressin: des-Gly<sup>9</sup>-[Phe<sup>2</sup>,Orn<sup>8</sup>]vasopressin (I), Gly<sub>2</sub>-des-Gly<sup>9</sup>-[Phe<sup>2</sup>,Orn<sup>8</sup>]vasopressin (II), and Gly<sub>2</sub>-des-Gly<sup>9</sup>-[Val<sup>4</sup>,Orn<sup>8</sup>]vasopressin (III). Comparison of the CD spectra for I, II, and III with those of the natural hormone, [Arg<sup>8</sup>]vasopressin, showed that at 180-240 nm the spectra were quite similar. However, in the 240-300 nm band distinct differences were noted between [Arg<sup>8</sup>]vasopressin and the three analogs of [Orn<sup>8</sup>]vasopressin, indicating that introduction of Gly moieties at the N-end of the des-9-Gly congeners leads to pronounced changes in the spatial environment of the aromatic side chains of tyrosine and phenylalanine. In addition, at 250-270 nm the CD of the analogs changes its sign and shows an increase in absolute value. Furthermore, in the case of the analogs enhancement of CD is seen in the region of aromatic absorption bands at about 290 nm. Analogs I, II, and III showed far less hormonal potency as vasopressors, antidiuretics, uretotonics, and galactogogues in rabbits than the natural hormone, demonstrating again that the receptors for native vasopressin are very sensitive to changes at position 9. Studies on rats on the development and retention of conditioned defensive response in Y-mazes demonstrated that analogs I, II, and III enhanced learning and memory, but to a considerably lesser extent than native vasopressin. The data presented here on the structure-activity parameters of I, II, and III provided further confirmation for the importance of molecular structures for biological activities of peptides and the care that should be exercised in designing pharmacologically active derivatives. Figures 1; tables 6; references 16: 6 Russian, 10 Western.

12172/06662

UDC 547.963.32.057

**Improved Method for Combined Chemical and Enzymatic Synthesis of Extended DNA Fragments**

18400280b Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript  
received 20 Mar 87) pp 43-47

[Article by M.L. Kobets, M.I. Rivkin, V.S. Bogachev and V.P. Kumarev, Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] Technical details are presented for an efficient and economical method for the synthesis of extended double-stranded DNA fragments, utilizing a combina-

tion of chemical and enzymatic methods. The advantage of this method rested on the fact that chemical synthesis was employed for the synthesis of only a single-stranded polynucleotide chain, with the complementary strand provided by E. coli DNA polymerase I. The specific studies were conducted with the synthesis of a 122 base-long polynucleotide chain responsible for the 73-102 amino acid sequence of human beta-interferon. The 122 base-long chain was assembled from two chemically synthesized 36 base-long strands and one 50 base-long strand, with linkage accomplished by DNA ligase. The complementary strand was then synthesized by the DNA polymerase using a 12-base primer complementary to the 3'-end. The resultant product was ascertained to contain sites susceptible to the actions of EcoRI and TaqI. A 95/93 bp fragment obtained after treatment with the restriction enzymes was cloned into plasmid pBR322 at EcoRI and ClaI sites. Subsequent amplification and sequencing of the plasmid confirmed successful insertion into the plasmid. Figures 2; references 9: 5 Russian, 4 Western.

12172/06662

UDC 577.113.4+535.217+535.338.43

**Highly Efficient Complementarily Addressed Laser Cleavage of Oligodeoxynucleotides**

18400280c Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript  
received 18 Mar 87; in final form 22 Jun 87) pp 48-57

[Article by L.Z. Benimetskaya, N.V. Bulychev\*, A.L. Kozionov, A.A. Koshkin\*, A.V. Lebedev\*, S.Yu. Novozhilov and M.I. Shtokman, Institute of Automation and Electrometry and \*Novosibirsk Institute of Bioorganic Chemistry, Siberian Department, USSR Academy of Sciences, Novosibirsk]

[Abstract] One of the most efficient means of site-targeted modification of nucleic acids is based on the coupling of a reactive group to a complementary nucleotide sequence and subsequent annealing. A similar approach was taken to laser cleavage at the T<sup>8</sup>-G<sup>9</sup> site in the target tetradecanucleotide pAGAGTATTGACTTA by annealing the target with pAATTACTCT (complementary to the target's A<sup>1</sup>-T<sup>8</sup> sequence) after pAATTACTCT had been coupled at its 5'-end with one of three ethidium bromide derivatives. Following illumination with a focused nitrogen laser beam (337 nm, 15 MW/cm<sup>2</sup>) the products were analyzed by gel electrophoresis. Evaluation of the cleavage products demonstrated specific cleavage at T<sup>8</sup>-G<sup>9</sup> with production of the octanucleotide in a yield approaching 10 percent, adduct formation between the two nucleotide sequences (cross-links) with a yield ranging from 20 to 70 percent, and latent damage to the target nucleotide sequence—inapparent on gel electrophoresis—with a yield of 7-27 percent. The total yield of molecular lesions within the specific target site was 50-80 percent with the different

chromophores. No cleavage was obtained with unmodified pAATTACTCT, free ethidium bromide derivatives, or in the absence of laser irradiation. Treatment of the products with piperidine increases the yield of specific cleavages to 40 percent due to breakdown of latent lesions in the target oligonucleotide. Free radical scavengers (1.3 M Bu<sup>1</sup>OH, 10 mM cystamine) had no effect on cleavage. The mechanism appears to consist of non-linear photoeffects based on two-photon excitation energy transfer from the chromophore molecule to the target site. Figures 4; tables 2; references 15: 11 Russian, 4 Western.

12172/06662

UDC 577.17:577.112.853.083+616-006.60

**Physicochemical and Immunochemical Characteristics of Carcinoembryonic Antigen Precipitins Crustacin and Cyprein]**

18400280d Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript received 23 Dec 87; in final form 28 May 87) pp 58-64

[Article by A.F. Pavlenko, A.V. Kurika, I.V. Chikalovets, N.I. Belogortseva and Yu. S. Ovodov, Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

[Abstract] Further studies were conducted on the oncoprecipitins previously isolated from *Cyprea caputserpentis* and *Pagurus prideauxii*—crustacin and cyprein, respectively—which react specifically with the carcinoembryonic antigen (CEA) [Ovodov, Yu.S., et al., DAN SSSR, 294(4): 1009-1010, 1986]. Preliminary studies have shown that crustacin is a protein with a MW of 44,000 D on SDS-electrophoresis in the unreduced state, and a MW of 17,000 D in the reduced state following treatment with 2-mercaptoethanol. Cyprein has been shown to a glycoprotein with 18 percent carbohydrate and a MW of 36,000 D which is unaffected by exposure to 2-mercaptoethanol. Unlike lectins that commonly react with a variety of glycoproteins in addition to CEA, crustacin and cyprein react only with CEA and not with biomolecules that share similar carbohydrate moieties. Furthermore, while lectins react with CEA with forward rate constants on the order of  $10^3$  to  $10^5$  M<sup>-1</sup>, the reactions of these two oncoprecipitins proceed with rate constants characteristic of antibody-antigen interactions:  $0.6 \times 10^8$  M<sup>-1</sup> for crustacin and  $1.3 \times 10^9$  M<sup>-1</sup> for cyprein. Finally, rabbit IgG raised against crustacin and cyprein reacts with antibodies against CEA in ELISA assays. Although the reasons for crustacin and cyprein in the invertebrates remains enigmatic, their high affinity and specificity suggests a putative role in the elimination of neoplastic cells. Figures 3; tables 3; references 26: 12 Russian, 14 Western.

12172/06662

UDC 577.114.5.008:579.842.23

**Structure of O-Specific Polysaccharide Chain of Yersinia intermedia Serovar 0:4.33 Lipopolysaccharide**

18400280e Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript received 12 Feb 87; in final form 7 May 87) pp 65-68

[Article by V.A. Zubkov, R.P. Gorshkova and Yu.S. Ovodov, Pacific Ocean Institute of Bioorganic Chemistry, Far Eastern Scientific Center, USSR Academy of Sciences, Vladivostok]

[Abstract] Chemical analysis was conducted on the O-polysaccharide component of the lipopolysaccharide complex of *Yersinia intermedia*, serovar 0:4.33, strain 1476, in order to refine the criteria on the basis of which *Yersinia* can be classified in a convenient and authoritative manner. The O-specific polysaccharide (yersiniose B) was found to consist of a basic trisaccharide unit encompassing 3,6-dideoxy-4-C-(hydroxyethyl)-xylo-hexose and 2-acetamido-2-deoxy-D-galactose in a 1:2 molar ratio. Additional studies utilizing <sup>13</sup>C-NMR spectroscopy, methylation, and HF solvolysis led to a depiction of the configurational features of the basic yersiniose B repeating trisaccharide complex. Figures 1; Tables 1; references 11: 3 Russian, 8 Western.

12172/06662

UDC 577.113.6.057:546.284

**Macroporous Silicate Carriers for Oligonucleotide Synthesis**

18400280g Moscow BIOORGANICHESKAYA  
KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript received 11 Mar 87; in final form 19 May 87) pp 119-120

[Article by S.I. Yastrebov, A.I. Lomakin, Yu.A. Gorbunov and N.N. Karpyshev, All-Union Scientific Research Institute of Molecular Biology, Koltsovo, Novosibirsk Oblast]

[Abstract] Experiments were designed to increase the capacity of carriers for oligonucleotide synthesis, employing macroporous silica gels coated with polyethyleneimine (PEI) or polyvinyl alcohol (PVA) films to increase capacity for nucleosides. Aminopropyl-Silochrome C-20 and aminopropyl-glass CPG-10 were coated with PEI by treatment with succinic anhydride in the presence of 4-N,N-dimethylaminopyridine for the introduction of carboxyl groups, followed by 1 or 10 percent PEI (30,000-40,000 D) in ethanol. PEI was then coupled to the carboxyl groups by means of treatment with dicyclohexylcarbodiimide and dimethylaminopyridine in pyridine. The resultant products had 130-220 nm pore diameters, specific surface areas of 15-25 m<sup>2</sup>/g, and

nucleoside capacities of 45-126  $\mu$ moles/g. Coating with PVA involved treatment of C-20 or CPG-10 with 1 percent PVA (80,000 D), washing, and cross-linking with diepoxy resin. The resultant carriers had pore diameters of 130-220 nm, specific surface areas of 15-25 m<sup>2</sup>/g, and nucleoside capacities in the 82-156  $\mu$ moles/g range. Both the automated phosphotriester method and the syringe-based phosphoramidate method of oligonucleotide synthesis provided yields of 85-96 percent on these carriers. Tables 1; references 9: 5 Russian, 4 Western.

12172/06662

UDC 615.384:547.963.4].014.314

### Stability of Hemoglobin Polymer

18400281d Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 22, No 1, Jan 88 (manuscript received 23 Jun 87) pp 81-84*

[Article by Ye.P. Vyazova, L.V. Fetisova, M.A. Azhigirova and A.A. Khachatryan, Central Scientific Research Institute of Hematology and Blood Transfusion, USSR Ministry of Health, Moscow]

[Abstract] The demonstration that pyridoxylated hemoglobin polymers (PHP) constitute efficient blood substitutes led to the assessment of various carbohydrates as preservatives for lyophilized PHP preparations. Efficiency of the carbohydrates was evaluated on the basis of attenuation of methemoglobin formation on storage at -20°C. The results demonstrated that in concentrations of 1:1 by weight glucose, sorbitol, xylitol, lactose, maltose, and sucrose limited methemoglobin formation over 2 months to a level of 0.8 to 1.3 percent. Basically a similar degree of protective effect was obtained with xylitol:glucose:PHP, xylitol:sorbitol:PHP, and xylitol:sucrose:PHP (0.5:0.5:1) combinations. Under identical testing conditions mannitol and mannose were ineffective, suggesting failure to form a protective lattice over the PHP. Over a 12-month period glucose and sorbitol restricted methemoglobin accumulation to a level of ca. 5 percent, while in the absence of preservatives the methemoglobin levels reached 15-20 percent. In order to control osmotic activity due to the carbohydrates, reduction of glucose and sorbitol by one fourth (i.e., 0.75 g per 1 g PHP) offered the same degree of protection for 6-8 months (i.e., 5 percent methemoglobin). Finally, it is noteworthy that the carbohydrates did not affect the P<sub>50</sub> and A<sub>n</sub> values in the concentrations employed for preservation. Figures 3; references 8: 4 Russian, 4 Western.

12172/06662

UDC 577.158.54:595.766.12:577.115.7

### Choline-Containing Phospholipids as Specific Activators and Stabilizers of Firefly Luciferase

18400255h Moscow *DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 5, Feb 88 (manuscript received 23 Jun 87) pp 1257-1260*

[Article by A.F. Dukhovich, N.Yu. Filippova, A.I. Yefimov, N.N. Ugarova, and I.V. Berezin (dec), USSR Academy of Sciences corresponding member, Moscow State University imeni M.V. Lomonosov]

[Abstract] In vitro studies were conducted with firefly luciferase to assess the effects of choline-based phospholipids on its activity and stability, in view of the demonstrated importance of protein-lipid interactions in many other membranous enzyme systems. In delipidation studies with sodium deoxycholate, only choline-containing phospholipids were shown to reactivate luciferase, with the efficiency decreasing in the following order: lysophosphatidylcholine, sphingomyelin, phosphatidylcholine. Addition of phosphatidylcholine to the luciferase preparations in the presence of the detergent stabilized the enzyme in a dose-dependent fashion. In addition, studies on the effects of phospholipases A<sub>2</sub> (derived from *Crotalus dirissus*) and C (*Bacillus cereus*) on luciferase showed variable effects: phospholipase A<sub>2</sub> stabilized luciferase while phospholipase C inactivated it. These effects were demonstrated to be due to the action of the phospholipases on the phosphocholine group. Phospholipase A<sub>2</sub> removed an acyl group from phosphatidylcholine, while phospholipase removed the phosphocholine group. Presumably, the active site of luciferase contains a choline phospholipid, the loss of which due to the action of phospholipase C inactivates luciferase. The presumed choline-containing phospholipid may well be phosphatidylcholine in view of the high concentration of this compound in the luciferase lipoprotein complex. Figures 3; references 13: 2 Russian, 11 Western.

12172/06662

UDC 557.150.5.5:577.153.4:615.785.4

### Enkephalins and Their Synthetic Analogs as Noncompetitive Reversible Inhibitors of Acetylcholinesterase

18400255c Moscow *DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 5, Feb 88 (manuscript received 6 Jul 87) pp 1260-1263*

[Article by S.A. Muranevich, M.V. Polosatov, and Ye. V. Rozengart, Institute of Physiology imeni I.P. Pavlov, USSR Academy of Sciences, Leningrad]

[Abstract] The demonstration that enkephalins are released into cholinergic synaptic clefts led to studies on the possible direct effects of the endogenous peptides and their synthetic analogs on acetylcholinesterase (AChE). The in vitro studies were conducted with AChE (EC 3.1.1.7) derived from human erythrocytes, with determination of a number of enzyme kinetic parameters. The data obtained showed that native leu- and met-enkephalins possessed the highest inhibitory potential, that the addition of a sixth amino acid moiety completely abolished any inhibitory effects, and that tetrapeptides were without inhibitory activity. Furthermore, the degree of inhibition was dependent on the duration of inhibitor-enzyme preincubation in the absence of the substrate, and the replacement of the Gly residue at position 2 by D-Ala and the C-terminal amino acid by D-Leu did not affect inhibitory activity. The enkephalins and their analogs behaved as reversible



noncompetitive inhibitors of AChE. The noncompetitive nature of the inhibition, the effects of preincubation, and the S-shaped curve of inhibition vs. inhibitor concentration indicate that the enkephalins function as allosteric inhibitors of AChE. Presumably, the enkephalins are bound to a receptor-like site on the enzyme and may have a functional role in modulating cholinergic neurotransmission. Figures 2; tables 1; references 9: 3 Russian, 6 Western.

12172/06662

**Adhesion and Activation of Thrombocytes on Ganglioside-GD3-Covered Surface**

18400067a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 296, No 5, Oct 87 (manuscript received 19 May 87) pp 1274-1277

[Article by A. V. Mazurov, N. V. Prokazova, I. A. Mikhaylenko, D. N. Mukhin, V. S. Repin and L. D. Bergelson, All-Union Cardiological Science Center, USSR Academy of Medical Science, Moscow]

[Abstract] In order to study the participation of gangliosides in cellular adhesion, the interaction of human thrombocytes with surfaces which were covered with the gangliosides found in vascular walls was investigated. It was found that ganglioside  $G_{D3}$  selectively stimulates adhesion, flattening and aggregation of thrombocytes. Plastic Multiwell culture dishes were coated with ganglioside and then incubated with  $Na_2^{51}CrO_4$ -labeled thrombocytes. Gangliosides  $C_{T1b}$ ,  $C_{D1a}$ ,  $C_{M1}$  and  $G_{M3}$  elicited the same adhesion as bovine serum albumin, 3.6%-5.65%, while  $G_{C3}$  elicited 7%-22% adhesion.  $G_{D3}$  from aorta had the same activity as that from milk, while  $G_{M3}$  from aorta and liver was equally inactive. Scanning electron microscopy demonstrated that only  $G_{D3}$  elicited flattening and aggregation of thrombocytes. Carbacyn inhibited  $G_{D3}$ -stimulated adhesion. It is possible that the strongly negative sialic acid residues at the end of the  $G_{D3}$  hydrocarbon chain are involved in stimulating adhesion, or that special receptors for this ganglioside are found on the thrombocyte surface. Exposure of  $G_{D3}$

when epithelial layers are damaged may be a factor in the attachment of thrombocytes to the vascular wall. Figures 2; references 15: 3 Russian, 12 Western

12126

**Papain Immobilized on Silica in Synthesis of Boc-Leu-Enkephalin**

18400067b Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 9, Sep 87 (manuscript received 19 Dec 86) pp 76-79

[Article by S. A. Ogiy, V. A. Tertykh and Yu. V. Mitin, Institute of Surface Chemistry, UkSSR Academy of Sciences, Kiev; Institute of Protein, USSR Academy of Sciences, Pushchino, Moscow Oblast]

[Abstract] The advantages of immobilized enzymes were used in the synthesis of the biologically active pentapeptide Leu-enkephalin. BocTyrGlyOCH<sub>2</sub>COGlyOH was condensed with HGlyPheLeuOH using silica-immobilized papain in pH 9.5 potassium phosphate buffer at room temperature. In order to immobilize the papain, the silochrome silica support was treated with  $\gamma$ -aminopropyltriethoxysilane and activated with cyanuric chloride. The activity of the immobilized enzyme depended on the initial papain concentration in the solution passed through the activated column. Incubation of Boc-Leu-enkephalin with the immobilized enzyme demonstrated that the extent of back hydrolysis is small at pH 9.5 but almost complete at pH 6.5. For the forward reaction, a two-fold excess of either component increased the yield from 57-62 mass percent to 70-89 mass percent, whereas conducting the reaction in the presence of Boc-Leu-enkephalin or its carboxyl hydrolysis product, BocTyrGlyOH, lowered the yield to 37-43 percent. The use of immobilized enzymes in an aqueous medium minimized the need for protective groups and permitted a short reaction time, 20-25 minutes. The yield was not lower than when the reaction is conducted in solution. The results indicate that papain immobilized on silica may be successfully used to condense peptide fragments. Figures 1; references 11: 4 Russian, 7 Western.

12126

UDC 615.384:547.221].074

**Poloxamer Behavior in Fluorocarbon Emulsions**

18400281a Moscow

KIIIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 22, No 1, Jan 88 (manuscript received 2 Jul 86) pp 23-27

[Article by V.V. Obraztsov and V.V. Ponomarchuk, Institute of Biological Physics, USSR Academy of Sciences, Pushchino]

[Abstract] Development in the recent use of poloxamers (pluronic; Sov. usage proxanols) as emulsifiers and stabilizers of perfluorocarbon (PFC)-based emulsions employed as blood substitutes has led to determination of the physicochemical nature of poloxamers in these systems. In the present case a gel filtration study on Sephadex G-200 columns was conducted with emulsions prepared from 10 percent by vol. of a perfluorodecalin and perfluorocyclohexylpiperidine mixture and 4 percent by vol. of either poloxamer I-168 (av. MW 5000; 20 percent by weight hydrophobic block) or poloxamer I-268 (av. MW 8000; 20 percent by weight hydrophobic block.). Gel filtration of the emulsions demonstrated that in the case of both poloxamers 30 percent of the surfactant was bound to PFC and 70 percent remained unbound (free). Comparison of the elution patterns of the free fraction and stock poloxamers confirmed identity of both molecular species and the fact that the free fraction was represented by trimers. Assessment of m.p. for free and bound poloxamers showed that the values for the bound forms were higher than for the free forms, with the values for stock preparations displaying intermediate values. These observations again confirmed the existence of bound and free (micellar) forms of I-168 and I-268, as well as the fact that the more hydrophobic molecules are bound and the more hydrophilic tend to remain unbound. The bound forms were found to form stable complexes showing no loss of poloxamer after storage at 20°C for 3 days, with the poloxamers forming a monolayer on the surface of the PFC droplets. The emulsions in question were thus demonstrated to constitute a multicomponent system, a fact that may account for variable physiological effects. Figures 4; references 15; 7 Russian, 8 Western.

12172/06662

UDC 612.1.532.5

**Effects of Hydrodynamic Resistance-Lowering Polymers on Blood Circulation**

18400255a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 5, Feb 88 (manuscript received 7 Jul 87) pp 1253-1256

[Article by M.V. Kameneva, M.S. Polyakova and I.A. Gvozdkova, Moscow State University imeni M.V. Lomonosov]

[Abstract] The demonstration of the Toms effect, i.e., the reduction in hydrostatic resistance by the addition of a soluble polymer, led to trials on polymers that would

have a similar effect in the circulatory system of animals. The present study concentrated on models of the circulatory system utilizing an elastic, transparent plastic tube with a constriction and a glass tube with bifurcations to assess the hydrostatic resistance-lowering effects of polyethylene oxide WSR-301. The effects of WSR-301 on steady flow were studied under conditions ensuring a Reynolds number of 1-200, known to be characteristic for the various components of the arterial system. A laser Doppler anemometer was used to monitor the distribution of the rate of flow across tube cross-section (velocity profile), with the development of eddy currents visualized by the addition of light-scattering polystyrene particles. The study showed that the critical Q value ( $Q = 0.5 \pi r^2 U_{max}$ ;  $r$  = radius,  $U$  = velocity) at which eddies developed after a constriction or a bifurcation for polymer concentrations of  $2 \times 10^{-6}$ ,  $5 \times 10^{-6}$ , and  $10^{-5}$  g/ml water was greater than the critical value for pure water by 5, 10, and 14.5 percent. Thus, the effects of polymer addition in terms of hydrostatic resistance were concentration dependent. These observations provided experimental confirmation for the efficacy of soluble linear polymers in reducing the predisposition to eddy formation after a constriction or a bifurcation, a finding that may have clinical applications. Figures 2; references 12; 7 Russian, 5 Western.

12172/06662

**Reduced Hydrodynamic Resistance in High Molecular Weight Erythrocyte Components**

18400068a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 296, No 3, Sep 87 (manuscript received 30 Apr 87) pp 740-742

[Article by S. S. Grigoryan, M. V. Kameneva, V. V. Smirnov, S. A. Shanoyan and A. A. Shakhnazarov, Institute of Mechanics, Moscow State University imeni M. V. Lomonosov; Institute of Cardiovascular Surgery imeni A. N. Bakulev, USSR Academy of Medical Sciences, Moscow]

[Abstract] Erythrocyte components were studied in connection with the reduced hydrodynamic resistance effect in blood. Addition to an erythrocyte hemolysate of 1M sodium chloride, 1% sodium dodecylsulfate or sodium hydroxide to a pH equal to or above 10.5, at 37°C, resulted in a suspension which had a hydrodynamic resistance which was 40-50% lower than that of physiological saline. The erythrocyte component which lowers hydrodynamic resistance has a proteinaceous character and is located on the internal, cytoplasmic side of the erythrocyte membrane. Spectrin, one of the surface proteins of the erythrocyte membrane which has a struc-

tural-mechanical role, may be the component responsible for the resistance-lowering effect. Further investigations are being conducted into the physiological role and practical uses of the effect. Preliminary results indicate a correlation between the structural-functional state of the

erythrocyte and the magnitude of hydrodynamic resistance lowering observed with the hemolysates. References 10: 4 Russian, 6 Western.

12126

**Plant Genetics Research in Estonia**

18400307 Tallinn SOVETSKAYA ESTONIYA in Russian 23 Mar 88 p 2

[Article by O. Priylinn, doctor of biological sciences and director of the Institute of Experimental Biology, Estonian SSR Academy of Sciences: "Genetics and Productivity: Understanding Their Relationship Reveals New Reserves in Agriculture"]

[Abstract] The department of plant genetics at the Institute of Experimental Biology of the ESSR Academy of Sciences has made a number of important gains in the transfer of the genetic material of wild species to related agricultural varieties. The successful transplantation of the chromosomes of wild species of wheat into an agricultural "relative," for example, has produced lines resistant to brown rust. Although the work has by no means created a new variety, it represents a start in the development of varieties resistant to the disease. The institute is conducting an entire series of priority experiments involving grains.

The difficulties inherent in such work involve the incompatibility of plants in hybridization, the complexity of cultivating hybrid embryos, and the extremely involved task of raising an entire plant from a single cell or a tissue culture.

Estonia, it would seem, is well suited for developing genetics as the basis of biotechnology. It has the support of all-union coordinating centers, as well as financial support in the form of state orders from the presidium of the USSR Academy of Sciences. The development of gene and cell technology is being planned in the Estonian Biocenter and the Estonian Agricultural Biocenter.

Training young scientific personnel in modern genetic disciplines, however, must be done more effectively, especially in the agricultural higher educational institutions.

13227

UDC 575.113

**Data Bank of Nucleotide Sequences Specific for Human Genome. Part 1. Structure of One Alu-Family Repeats**

18400280f Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 14, No 1, Jan 88 (manuscript received 8 Jul 87) pp 114-115

[Article by S.G. Arsenyan, N.A. Lisitsyn, R.L. Allikmets, I.V. Malyshev and Ye. D. Sverdlov, Institute of Bioorganic Chemistry imeni M.M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] In the process of creating a data bank of nucleotide sequences specific for the human genome, a technique was utilized in which differential hybridization was employed between human and chimpanzee DNA. The resultant human fraction that failed to hybridize with chimpanzee DNA was subsequently cloned into vector  $\lambda$ gt10 by techniques to be published elsewhere. One of the clones obtained in this manner (No 44) was shown contain highly repetitive sequences belonging to the Alu-family of repeats with a length of about 300 bp. Sanger analysis of the primary structure revealed 23 point mutations and two deletions of 3 base pairs in the 208-214 region. References 4 (Western).

12172/06662

UDC 615.371:616.98:579.8

**Combined Synthetic Antigen Consisting of O-Specific Polysaccharides and Exotoxin A of *Pseudomonas aeruginosa***

18400255d Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 5, Feb 88 (manuscript received 20 Oct 87) pp 1277-1280

[Article by B.A. Dmitriyev, V.A. Kulshin, N.G. Antsiferova, V.A. Vovk, and A.F. Moroz, Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences, Moscow]

[Abstract] Details are presented on the construction of a combined vaccine from *Pseudomonas aeruginosa* serotypes 1, 2, and 7, consisting of both a polysaccharide (PS) and exotoxin A (ETA) or bovine serum albumin (BSA). The respective polysaccharides were prepared from the lipopolysaccharide (LPS) complex of *Ps. aeruginosa* by mild acid hydrolysis (1% CH<sub>3</sub>COOH, 100°C, 4 h), yielding a 45,000 D component for serotype 1 (PS-1), a 10,000 D entity for serotype 2 (PS-2), and a 50,000 D PS for serotype 7 (PS-7). All three preparations retained full serologic activity. Further acid hydrolysis of PS-1 and PS-7 (0.1 M CF<sub>3</sub>COOH, 100°C, 2-4 h) transformed both components into modified polysaccharides, i.e., 100,000 D PS-1m and PS-7m, again with retention of serologic specificity. Following introduction of appropriate amino spacer groups into ETA and BSA, conjugates were formed between the protein moieties and PS-1m, PS-2, or PS-7m using either the water-soluble carbodiimide method or the cyanogen bromide technique. The (1.5-2) x 10<sup>5</sup> D conjugates were then used for immunization of 18-20 g outbred mice (50 µg subcutaneously) for a total of 4 injections at 7-day intervals. The first injection was done in conjunction with 10 ng LPS as an adjuvant, which was nonimmunogenic at this level. Two weeks after the last vaccination the animals were challenged i.p. with a 3-5 LD<sub>50</sub> dose of live virulent *Ps. aeruginosa* cells varying in toxigenicity. The survival statistics demonstrated that the synthetic vaccines were

capable of assuring 100 percent protection with either the ETA or the BSA conjugates, depending on the toxigenicity of the strain. Furthermore, the use of subimmunogenic quantities of LPS markedly enhanced the immune response to the synthetic vaccines. Tables 1; references 10: 3 Russian, 7 Western.

12172/06662

UDC 612.017 + 577.336

**Study of Antibody Reaction With Cells Using Fluorescent Lipid Sensors**

18400274c Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 6, Feb 88 (manuscript received 25 Jun 87) pp 1505-1508

[Article by A. G. Tonevitskiy, Ye. M. Manevich, O. S. Zhukova and L. D. Bergelson, All Union Scientific Center of Cardiology, USSR Academy of Medical Sciences; Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow]

[Abstract] A new sensitive method for investigation of ligand-receptor interaction based on registration of the changes in the lipid environment of the receptor resulting from the binding of the ligand was developed. This was achieved by means of a fluorescent sensor: anthryl-vinyl-labeled sphingomyelin (ASM) fixed in the plasma membrane. This method was tested on ricin B-subunit binding to Burkitt's lymphoma EV-3 cells labeled with ASM. This method does not require any radioactive labeling of the ligand, which normally leads to a loss of activity, and it can register binding of a few dozen protein molecules per cell. Fluorescent determination made possible reliable detection of antibodies bound to the light chain of human Ig at a 10<sup>-12</sup> M concentration (about 500 antibody molecules per cell). Figures 2; references 6: 3 Russian, 3 Western (2 by Russian authors).

07813/7310

**Use of Computer Technology in Military Health Care**

*Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 1, Jan 88 pp 24-25*

[Article by R. S. Abdrashitov, Honored Physician LiSSR, Major General, Medical Service and G. N. Dyadyk, Lieutenant Colonel, Medical Service]

[Abstract] Basic trends in the use of computer technology presently being employed in the military health services were described and discussed briefly. The trends include: use of computers to improve quality of medical aid in military hospitals, use of computer devices to provide rapid and efficient procurement of data concerning medical service activity for subsequent use in administrative work and use of computers with communication systems to provide access of medical workers to medical data bases in order to make and confirm diagnoses, obtain reference material and provide consultation with physicians and patients in remote points. The first trend is associated with development of complexes of problems related to functional diagnosis and preparation of automatic monitoring systems, processing results of X-ray and laboratory studies and of automated questionnaires. The second trend is associated with developing quantitative medical statistical indicators and organizing accounting and bookkeeping systems, and the third trend is related to problems concerning automation of diagnoses.

02791

**Computer-assisted Diagnosis of Acute Diseases of Peritoneal Organs on Ships at Sea**

*18400244b Moscow VOYENNO-MEDITSINSKIY ZHURNAL in Russian No 1, Jan 88 pp 58-59*

[Article by G. F. Denisov, Major, Medical Service, O. I. Larichev, professor, Doctor of Technical Sciences, V. P. Malygin, Candidate of Medical Sciences, Colonel, Medical Service, A. I. Mechitov, Candidate of Technical Sciences, Ye. M. Moshkovich, Candidate of Technical Sciences, M. V. Portnoy, Doctor of Medical Sciences, Major-General, Medical Service, retired and Ye. M. Furems, Candidate of Technical Sciences]

[Abstract] A system to be used for diagnosis of abdominal complaints by seamen aboard ships at sea was described and discussed. The system consists of 2 parts: a knowledge base and rules of logical discourse which assist in analyzing a specific case on the basis of data in the knowledge base. Preparation of the knowledge base included systematization of generally known signs (symptoms) of abdominal disease, confirmation of them and description of them in a computer-usable form. The system included 10 diseases most frequently encountered aboard ship (acute appendicitis, acute cholecystitis, acute pancreatitis, perforated peptic ulcer and duodenal ulcer, acute intestinal obstruction, thromboembolism of mesenteric vessels, gastro-intestinal bleeding, closed trauma of the abdomen with injury to internal organs, intestinal and renal colic and peritonitis) and 4 diseases closely simulating these (acute gastritis, food poisoning, myocardial infarction (abdominal form) and pneumonia). Diagnosis and differential diagnosis were performed by use of 29 signs (symptoms) which could be recognized by traditional methods and by laboratory studies under shipboard conditions. The computer can be used to provide a diagnosis or 2 tentative diagnoses, when needed. The device may prove to be useful in cases in which the physician has limited opportunity for diagnosis and consultation and may be used for training purposes.

02791

UDC 577.1:547.963.3

**Genetically Engineered Mutants of Human Hepatitis B Virus Core-Antigen Which Maintain Native Self-Assembly**

18400274a Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 298, No 6, Feb 88 (manuscript received 13 Jul 87) pp 1474-1478

[Article by G. P. Borisova, Ya. V. Kalis, P. M. Pushko, V. V. Tsibinogin, V. Ya. Loseva, V. P. Ose, E. I. Stankevich, A. Ya. Dreymane, D. Ya. Sniker, E. E. Grinshteyn, P. P. Pumpen and E. Ya. Gren, Institute of Organic Synthesis, Latvian SSR Academy of Sciences; Experimental Plant of the Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga]

[Abstract] Core-antigen (HBcAg) is the basic structural unit of the nucleocapsid of human hepatitis B virus (HBV), forming isometric particles in infected hepatocytes carrying the viral genome. HBcAg is a promising model for protein engineering of capsid structures for formation of "exposition" vectors of foreign antigenic

determinants. This requires insertion of DNA fragments coding the respective determinants into specific segments of the C gene without affecting assembly properties of the protein. The goal of this work was to localize segments not directly involved in assembly using genetically engineered HBcAg mutants carrying inserts of short synthetic oligonucleotides at various restriction sites in the C gene. Most interesting was the MspI restrictase site, which is located at the codon for amino acid 144. It was shown that insertion of a mutation insert at amino acid 144 did not alter the ability of the mutant protein to form capsids; the length and the original structure of the insert had no effect on capsid formation. A different picture was seen during insertion at the XbaI site at the N-terminus. Overall, HBcAg showed a certain capacity for cloning foreign amino acid sequences. Without affecting self-assembly, mutations may be introduced at amino acids 144 and 178 in the  $\alpha$ E-helix and in the non-structured C-terminal segment of the protein but not at amino acid 30 of the  $\alpha$ B-helix. Figure 4; references 15: 3 Russian, 12 Western.

7813/7310

**Method for Studying Localized Physiological Effects of Millimeter Radiowaves on Biological Objects**

18400232b Leningrad FIZIOLOGICHESKIY  
ZHURNAL SSSR IMENI I. M. SECHENOVA in  
Russian Vol 73, No 12, Dec 87 (manuscript received 26  
May 86) pp 1705-1708

[Article by G. T. Butkus, G. M. Chernyakov, V. O. Samoylov, A. S. Pauzha and Ye. V. Bigday, Vilnius; Leningrad]

[Abstract] An experimental study of conditions which ensure reliable irradiation of biological tissue by an electromagnetic field of millimeter waves during microscopy was described and discussed. An energy current density from 40-400  $\mu\text{W} \times \text{cm}^{-2}$  was ensured by use of a wave guide radiator and a special design travelling-wave antenna with the irradiated power of the generator at 15 mV and electromagnetic field intensity of 53.57-78.33

GHz in the working zone of the quartz objective. A travelling wave antenna provided higher energy current density. More precise measurement of the electromagnetic field operating on the biological object was required in the course of the experiment during focusing of the optical system, especially during change of the electromagnetic field frequency in a range of more than plus or minus 5 GHz. Use of the fluorescent method made it possible to register short latent (latent period 1-2 minutes) reactions of biological tissues to millimeter radiowaves of nonthermal low intensity, arising directly at the site of impact of the electromagnetic field on the object. Preliminary studies performed on isolated frog heart showed that use of the fluorescence method makes it possible to register changes of metabolism under the effect of millimeter radiowaves with a probability of at least 80 percent, beginning in the first minute after the start of irradiation. Figures 3; references 4 (Russian).

02791



UDC 615.212.7:547.9343].032.82.015.4:612.884

**Effects of Intrathecal Administration of Opiate Agonists on Behavioral and Hemodynamic Manifestations of Pain**

18400282a Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian* Vol 51, No 1, Jan-Feb 88 (manuscript received 3 Jul 86) pp 23-25

[Article by A.A. Zaytsev, N.V. Petryayevskaya and A.A. Khvan, Department of Pharmacology, First Leningrad Medical Institute imeni I.P. Pavlov]

[Abstract] The involvement of the various types of opioid receptors in the behavioral and hemodynamic manifestations of pain was assessed, using male rats subjected to painful thermal and electrical tail stimulation. Specific agonists of mu, sigma, delta, and kappa receptors were injected intrathecally at the upper level of the lumbar segments. Although administration of bremazocine (10-20 µg) and phencyclidine (10-50 µg) prolonged the latent period for tail withdrawal and the latter agent also enhanced hypertensive changes in response to the pain, the fact that the effects of both agents were not affected by naloxone excluded mediation by, respectively, kappa and sigma receptors. Administration of DAGO (D-Ala<sup>2</sup>-Gly-o<sup>5</sup>-enkephalin; 0.5 µg), known to act on mu receptors, and of DADL (D-Ala<sup>2</sup>-D-Leu<sup>5</sup>-enkephalin), an agonist of delta receptors, also prolonged the latent period for tail withdrawal. However, while DAGO attenuated the rise in blood pressure in pain-stressed animals, DADL potentiated the hemodynamic response. These observations clearly demonstrated the key role of the mu and delta receptors in mediating the behavioral and hemodynamic manifestations of pain since their effects were blocked by the administration of naloxone. In the animal species employed in this study the data also indicated that transmission of information to the higher levels of the CNS was attenuated by mu receptor agonists, and facilitated by delta receptor agonists. Tables 1; references 10: 4 Russian, 6 Western.

12172/06662

UDC  
615.214.2:547.745].036.8:[612.273.2.014.49+613.863

**Efficacy of Piracetam in Hypoxic States and Emotional Stress**

18400282b Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian* Vol 51, No 1, Jan-Feb 88 (manuscript received 12 Aug 86) pp 31-33

[Article by Ye.Ya. Kaplan and M.M. Rasulov, Laboratory of Pharmacology of Adaptogenic Agents, Scientific Research Institute for the Biological Testing of Chemical Agents, Kupavna, Moscow Oblast]

[Abstract] In order to expand the informational database on pharmacologic effects of piracetam, outbred albino mice (18-22 g) and female Wistar rats (120-150 g) were

employed in assessing the effects of piracetam in hypoxic and emotional stress states. Intraperitoneal administration of the drug to mice in various doses (200 or 500 mg/kg) prior to hypobaric hypoxia (equivalent to 10,000 meter elevation above sea level, 30 m/sec) led, under optimum conditions, to a 2.5-fold improvement in the survival rate. However, enhanced survival in the case of acute asphyxia was seen only if piracetam was administered 0.5 h prior to the episode and not earlier. Studies on the rats, maintained on 50 mg/kg/day piracetam for 30 days in conjunction with sex deprivation and monitored for weight gain and estrus duration, showed that the experimental rats exhibited a much greater degree of motor activity and aggressiveness than the untreated control animals. Furthermore, the weight gain in rats maintained on piracetam was much greater, and the duration of the diestrus phase and of the entire sexual cycle was shortened. Piracetam also depressed respiratory activity of hepatic mitochondria, while polarographic studies on deoxygenation of erythrocytes indicated that hemoglobin affinity for oxygen was increased. Overall, piracetam was shown to mitigate the adverse effects of hypoxic and emotional stress via neuroendocrine, bioenergetic, and direct effects on oxygen transport. Figures 1; tables 1; references 6: 4 Russian, 2 Western.

12172/06662

UDC 615.272.4.014.425.033/.034

**Metabolism of 3-Hydroxypyridine Antioxidants**

18400282c Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian* Vol 51, No 1, Jan-Feb 88 (manuscript received 17 Dec 86) pp 55-59

[Article by V.P. Zherdev, A.K. Sariyev, T.A. Voronina, N.A. Klyuyev and L.D. Smirnov, Scientific Research Institute of Pharmacology, USSR Academy of Medical Sciences, Moscow]

[Abstract] The fact that 3-hydroxypyridine (3HP) antioxidants exert their wide spectrum of pharmacologic activities by inhibiting lipid peroxidation and, therefore, by altering the physicochemical nature of biological membranes, led to further studies on the metabolism of these agents in order to delineate key metabolites underlying their pharmacologic effects. Metabolic studies on one 3HP analog, 2-ethyl-6-methyl-3HP (EMHP), in outbred male rats following intraperitoneal injection of 150 mg/kg EMHP led to the identification of 5 key metabolites representing dealkylated and conjugated products of metabolic transformation, on the basis of which a catabolic scheme was devised. One metabolite, EMHP phosphate, however, was identified as playing a crucial role in the pharmacology of EMHP. EMHP phosphate was demonstrated to accumulate in high doses in the liver immediately after administration and to persist for several days. On release into the blood stream it was immediately subjected to hydrolysis by alkaline phosphatase and release of EMHP which then again reentered the liver for conversion to the phosphate form.

It, therefore, appears that the liver serves as a depot for the storage and release of EMHP and may thus account for long-term sequelae attributable to this class of agents. Further studies appear to be in order to assess the pharmacokinetics of 3HP and EMHP and of their effects on energy metabolism. Figures 3; references 4 (Russian).

12172/06662

UDC 615.225.3.015.4:]616.12-008+616.13-008.1

**Effects of Single Glyvenol Administration on Human Hemodynamics**

18400282d Moscow *FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 51, No 1, Jan-Feb 88 (manuscript received 12 Nov 86) pp 71-72*

[Article by A.Yu. Modin, Institute of Biomedical Problems, USSR Ministry of Health, Moscow]

[Abstract] To further define the mechanism of action of glyvenol (ethyl-3, 5, 6-tri-O-benzyl-D-glucufuranoside) in the management of orthostatic hypotension, selected hemodynamic parameters were monitored in 8 healthy males given 1-1.4 g glyvenol. The subjects were monitored when in the horizontal position and with the rotating bed adjusted to +70°. Control studies without drug administration demonstrated that the subjects responded normally to the rotation to the vertical position. The stroke volume and the minute volume decreased by 42 and 25 percent, respectively, while the heart rate and the total peripheral resistance showed respective increases of 29 percent and 41 percent. Glyvenol administration had no effect on the minute volume, but led to an increase in arterial blood pressure and peripheral resistance. Stroke volume was not affected. These observations were consistent with the view that glyvenol largely affects arterial hemodynamics, exerting a permissive effect on vasopressor mechanisms in the orthostatic test. Figures 6: 4 Russian, 2 Western.

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UDC 615.849.2.015.25.012.1

**N'-(2-Adamantyl)Diethylenetriaminetetraacetic Acid: Synthesis, Complex Formation, and Antidote Properties**

18400281b Moscow  
*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 22, No 1, Jan 88 pp 42-47*

[Article by L.N. Lavrova, L.I. Tikhonova, I.M. Parfenova, A.A. Smirnov, A.T. Ivannikov and V.G. Yashunskiy, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] As an expansion of studies on analogs of diethylenetriaminepentaacetic acid, N'-(2-adamantyl)-diethylenetriaminetetraacetic acid (I) was synthesized to assess the effects of the hydrophobic adamantyl group

on stability, acid-base characteristics, and chelating efficiency. I was synthesized by the reaction of 2-bis(2-chlorethyl)aminoadamantane with dimethyl iminodiacetate followed by saponification. Potentiometric studies on I demonstrated that the values of  $pK_1$ ,  $pK_2$ ,  $pK_3$ , and  $pK_4$  were increased due to inductive effects of the adamantyl residue in comparison with analogs containing acetic or aliphatic radicals on the central nitrogen atom. Furthermore, the absence of the acetate radical on the central nitrogen atom destabilized I, and the bulky adamantyl radical hindered complex formation with  $Cu^{2+}$ ,  $Ca^{2+}$ , and  $Eu^{3+}$ . Combined administration of I and  $^{241}Am$  to experimental animals showed that I was relatively ineffective in facilitating removal of the radionuclide from the liver and the skeleton. Furthermore, I was entirely without effect in terms of facilitating removal of  $^{239}Pu$  from the body. Tables 2.

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615.272.014.425:615.453.4].012

**Microencapsulation of Dibunol in Acetylphthalylcellulose Films**

18400281c Moscow  
*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 22, No 1, Jan 88 (manuscript received 22 Sep 86) pp 78-80*

[Article by Ye. S. Berseneva, L. A. Pavlova and L. S. Smagina, Vitaminy Scientific Production Association, Moscow]

[Abstract] Dibunol-containing microcapsules were prepared from acetylphthalylcellulose (APC) films in order to obtain long-acting dosage forms of the drug. APC was selected as the medium of choice because it is relatively stable on exposure to gastric juices, yet fully soluble in the intestine. The basic technique of microcapsule preparation involved encapsulation of crystalline dibunol (100-250 microns, major fraction) by coacervation with 20 percent  $Na_2SO_4$  of 2 percent APC at 60°C and mixing at 100 rpm. The mixture was cooled to 5-7°C for gelling with mixing at 150-200 rpm and then treated with 40 percent  $CH_3COOH$  to harden the capsules. Approximately 91 percent of the microcapsules were represented by the major 160-250 micron fraction consisting, on a weight basis, of ca. 85 percent dibunol. Studies with isolated rat intestinal loops demonstrated that the capsules dissolved over a period of 30 min, with the tissue uptake and dibunol concentration peaking at that time. The in vitro demonstration of the gradual increase in dibunol concentration in the intestinal tissue indicates that under in vivo conditions microcapsules would ensure a steady ingress of the drug into the blood stream. Introduction of unencapsulated dibunol into the intestinal loop led to immediate peaking, indicating the lack of a steady long-term in vivo effect. Figures 1; tables 1; references 6: 4 Russian, 2 Western.

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**Study of Some Pharmacological Properties of Heterocyclic Analogs of Prostaglandins**

18400227a Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 21, No 10, Oct 87 (manuscript received 15 Jul 86) pp 1185-1187*

[Article by L. V. Kadysheva, Ye. V. Gracheva, Ye. Ye. Zhuravleva, L. V. Sorokin, V. A. Dombrovskiy and V. Ye. Belay, All-Union Scientific Research Institute of Technology of Blood Substitutes and Hormonal Preparations, Moscow]

[Abstract] The search for preparations closely resembling natural prostaglandins in structure but acting more selectively while being stable and readily tolerated by humans is quite important. In view of this, heterocyclic analogs of prostaglandins based on pyrrole and indole were synthesized. This article describes a comparison of the effect of natural prostaglandins  $E_2$  and  $F_{2, \alpha}$  with the effect of four synthesized, nitrogen-containing analogs on cardiovascular activity (blood pressure), the nervous system (orientation reflex) and platelet aggregation activity. Blood pressure studies were performed on rabbits of both sexes (weight 2-2.5 kg). Intravenous injection of prostaglandin  $F_{2, \alpha}$  produced a dose-dependent hypotensive effect. Doses of 0.2-0.4 mg/kg produced an immediate and brief drop of blood pressure by 50-60 percent followed by a return to a near normal level and then a prolonged hypotensive phase. A 0.05-0.1 mg/kg dose reduced blood pressure by the first minute after injection, and it remained at this level for 10-15 minutes. Prostaglandin  $E_2$  produced a 60-70 percent reduction of blood pressure and kept it at this level for 20-30 minutes. The analogs produced blood pressure changes at a dose of 3.2 mg/kg. The pyrrole analog with a keto group at  $C_{15}$  reduced arterial pressure by 24 percent and the indole analog with a hydroxyl group at  $C_{15}$  reduced it by 12.5 percent. The effect of the analogs on the orientation reflex, studied in 200 rats, was less pronounced than the effect of the natural prostaglandins. The natural prostaglandins promoted platelet aggregation. The indole prostaglandin analog with the hydroxyl group at position  $C_{15}$  stimulated platelet aggregation activity but the indole analog with the keto group in this position did not. Figures 2; references 6: 4 Russian; 2 Western.

02791

**Statistical Aspects of Relationship Between Radioprotective Activity of Derivatives of Mercaptoethylamine and Its Analogs and Their Electronic Parameters**

18400227b Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 21, No 10, Oct 87 (manuscript received 31 Dec 86) pp 1210-1216*

[Article by V. K. Mukhomorov, Military Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] A search for statistical correlations between electronic structure parameters and radioprotective action of derivatives of mercaptoethylamine and its analogs established the cause-effect relationship between structural changes of the compounds due to variation of substituents and their positions and the radioprotective properties of the compounds. Analysis of electronic characteristics of 45 substituted aminothioles and their analogs showed that the most informative of all electronic parameters which correlate with radioprotective action is the boundary single-electron energy. Correlation equations describing electronic parameter-dependent changes in the radioprotective properties were presented and discussed. Figure 1; references 18: 9 Russian; 9 Western,

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**Computer-assisted Approach for Study of Prostaglandin Structure-Biological Activity Relationships**

18400227c Moscow

*KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 21, No 10, Oct 87 (manuscript received 22 Jul 86) pp 1216-1221*

[Article by L. G. Ignatovich, L. S. Gitlina, B. G. Strupulis, Ya. F. Freymanis, V. Ye. Golender and A. V. Rozenblit, Institute of Organic Synthesis, Latvian SSR Academy of Sciences, Riga]

[Abstract] An attempt to determine what structural elements a molecule should possess in order that a potential prostaglandin preparation does not produce a harmful side effect involved creation of a data base which includes structural formulas of about 700 prostaglandins and information about their biological activity. The data base also contained information about the 10 most typical forms of biological tests for prostaglandins. Structural characteristics which predict "inadequacy" with high probability for all forms of biological activity of prostaglandins represented in the data base were selected. The PRIZNAK programmed system, which realizes one of the versions of a logical-structural approach to analysis of the structure-activity relationship, was used in an NR-1000 computer. This approach revealed the most typical signs of inadequacy. Four prostaglandins were presented as exceptions in that they are shown to be inadequate according to the analysis but appear to be highly effective. References 9: 2 Russian; 7 Western.

02791

**Effect of Vasopressin Analogs on Course of Emotional Stress**

18400231a Kiev *FIZIOLOGICHESKIY ZHURNAL* in Russian Vol 33, No 6, Nov-Dec 87 (manuscript received 24 Sep 85) pp 8-17

[Article by V. N. Sinitskiy, O. S. Papsuyevich, L. S. Usherenko, L. A. Kryzhanovskaya, B. A. Zapotochnyy, O. P. Ugarova and G. I. Chipens, Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences, Kiev; Institute of Organic Synthesis, LaSSR Academy of Sciences, Riga]

[Abstract] Experiments on 355 rats revealed the effect of 3 vasopressin analogs without peripheral hormonal activity on the bioelectrical activity of the brain, the conditioned reflex avoidance reaction, levels of adrenaline, noradrenaline, serotonin and 11-hydroxycorticosteroid in the blood and noradrenaline levels in tissues of the motor cortex, hypothalamus and mid-brain in intact animals and in animals under 2 models of emotional stress. The vasopressin analogs possessed properties of a neuromodulator and may produce, depending upon the dose, stimulation or inhibition of processes of noradrenergic and serotonin-ergic mediation in the brain. The analogs can be used as adaptogenic agents during different forms of emotional stress. Figures 1; references 15: 9 Russian; 6 Western.

02791

**Assessment of Thermal State of Human Body Under Water With Different Degree of Protection From Cold**

18400231b Kiev *FIZIOLOGICHESKIY ZHURNAL* in Russian Vol 33, No 6, Nov-Dec 87 (manuscript received 28 Oct 86) pp 59-65

[Article by V. A. Kozak, V. N. Ilyin, V. A. Kramarenko, V. Ya. Fridlyanskiy, A. P. Bondarenko and T. F. Gritsenko, Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences, Kiev]

[Abstract] Divers (7) in wet suits with different measures of thermal protection were immersed, in a state of rest, up to a depth of 15 m at 20 °C. Four types of diving suits were used. Determination of skin temperature changes in different parts of the immersed divers' body and the relationship of these changes with the "weighted mean" skin temperature permitted formulation of a method of rapid and relatively simple assessment of the thermal state of a man under water. Different values of "weighted mean" skin temperature and the nature of the changes under different thermal protection of the divers provided three criteria for assessing thermal protection of the human body under water. The criteria are: the initial "mean weighted" skin temperature should be within optimal (31-32 °C) or permissible (29-30 °C) temperatures; the rate of drop of the diver's skin temperature during a dive (especially at first) should not exceed a critical value which keeps the diver's skin

temperature above the permissible value; a linear change of the "mean weighted" skin temperature indicates good thermal protection of the diver. The method may be simplified by measuring skin temperature in certain parts of the body in the first 10-20 minutes of a dive. The data may be used to predict how long a diver may remain under water without risking supercooling. Figures 2; references 16: 6 Russian; 10 Western.

02791

**Effect of Microinjections of Oxytocin Into Lateral Septum Nucleus on Intravenous Self-injection of Heroin in Heroin-tolerant Rats**

18400232a Leningrad *FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I. M. SECHENOVA* in Russian Vol 73, No 12, Dec 87 (manuscript received 8 Oct 86) pp 1625-1629

[Article by R. Sh. Ibragimov and G. Kovach, Laboratory of Adaptive Functions of the Brain (head, R. Sh. Ibragimov), Institute of Physiology imeni A. I. Karayev, AzSSR Academy of Sciences, Baku; Department of Pathophysiology (director, J. Telegdi), Szeged Medical University, Hungary]

[Abstract] It has been established, in recent years, that oxytocin weakens development of tolerance to and dependence on narcotic analgesics. A study of the effect of microinjections of oxytocin into the n. accumbens on intravenous self-injection of heroin in heroin-tolerant rats used CFY line rats (weight 200-240 g) trained to perform self-injection of heroin after 6 days. The number of pressings of the pedal which supplied heroin increased on the 5th and 6th day of training in comparison with those on the 1st two days and the total length of time of pressing the pedal also increased. Injection of oxytocin into the n. accumbens significantly decreased both parameters. Restoration of self-injection of heroin occurred on the 3rd day after microinjection of oxytocin. Figures 3; references 8 (Western).

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UDC 612.014.3

**Spatiotemporal Characteristics of Potential-Dependent Optical Signals of Mollusk Ganglions Obtained with 100-Cell Photodiode Matrix**

18400274b Moscow *DOKLADY AKADEMII NAUK SSSR* in Russian Vol 298, No 6, Feb 88 (manuscript received 29 Jun 87) pp 1497-1502

[Article by S. V. Yagodin, V. M. Slutskiy, V. L. Sukhanov, Yu. L. Slonimskiy, V. M. Stolovitskiy, V. P. Valyukhov and S. V. Popov, Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad; Institute of Organic Chemistry, UkSSR Academy of Sciences, Kiev; Physicotechnical Institute imeni A. F. Ioffe, USSR Academy of Sciences, Leningrad; Leningrad Polytechnical Institute imeni M. I. Kalinin; Special Design Bureau of Analytical Equipment Construction, Scientific Technical Association, USSR Academy of Sciences, Leningrad]

[Abstract] Analysis of integrated activity of neuron populations requires a multiple channel registration of electrical processes of nerve cells. Multichannel optical registration detects synchronous activity of a multitude of neighboring nerve elements without any traumatic effects on them. Using one photodetector and some sensitive dyes, optical signals were detected in mollusk nerve preparations which represent action potentials of nerve cells. It was shown that nerve cells of visceral, parietal and pedal ganglia do not form any special excitation zones. With electric stimulation of the nerves approaching the ganglion, impulsation amplification is observed in neurons of the entire ganglion; this activity is not transformed from one area to another and is not accumulated but dissipates in each neuron with time. It was not possible to register optically the action potentials of peripheral buccal neurons. Figures 4; references 15: 4 Russian, 11 Western (1 by Russian authors).

7813/7310  
UDC 612.825+612.822.3

**Origins of Human Magnetic Alpha Brain Activity**

18400230a Moscow *FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 6, Nov-Dec 87 (manuscript received 11 Apr 86) pp 934-939*

[Article by V.L. Vvedenskiy, K.G. Gurtovoy, R. Ilmoniyemi\*, and M. Kayola\*, Institute of Atomic Energy imeni I.V. Kurchatov, Moscow; Technical University, Helsinki, Finland]

[Abstract] Multichannel magnetometric studies were conducted on two males, 28 and 37 years old, to detect the localization and nature of current sources of magnetic alpha-rhythms. The four-channel recordings led to the identification of alpha-rhythm spindles lying in the 9.2 to 11.2 Hz range. The spindles were due to excitation of 5 to 10 cm<sup>2</sup> surface areas of the cortex, with the average depth of point current dipoles being 3 +/- 1 cm. The highest concentration of such dipoles was localized at the interface of the occipital and parietal cortex. Figures 3; references 12: 3 Russian, 9 Western.

12172/06662

**Lateralization of Pupillomotor and Acousticomotor Responses During Examination Stress**

18400230b Moscow *FIZIOLOGIYA CHELOVEKA in Russian Vol 13, No 6, Nov-Dec 87 (manuscript received 22 Mar 86) pp 1032-1035*

[Article by Ye.S. Velkhover, V.A. Korotich, R.M. Bobkova, Ye.G. Bilyk, O.Ya. Bokser, and T.S. Naumova (dec), People's Friendship University imeni P. Lumumba, Moscow; Moscow Medical Stomatological Institute imeni V.A. Semashko]

[Abstract] An assessment was conducted on the effects of an oral examination on lateralization of pupillomotor and acousticomotor responses in two groups of students at the institute, in order to evaluate neuropsychological

correlates of this particular type of stress. Both parameters were lateralized in the baseline state (several weeks before the examination). Variable results were obtained in the immediate pre-examination phase and during the actual examination, again consistent with lateralization. However, the differences between the baseline state and the pre-examination state and between the pre-examination state and the responses during examination showed that the latter two situations differed in terms of stress. The pre-examination phase was accompanied by reactions consistent with a higher level of stress than the actual examination in the pupillary constriction test, while the inverse findings were applicable to the acoustic test. However, these differences may have been due to the fact that in the former case the examination was conducted by a familiar faculty member, whereas in the latter case an unfamiliar faculty member was employed. Left-sided lateralization became more pronounced during the entire examination process in both tests, indicating that while emotional stress may vary depending on the environment, the intensity of mental activity continues to increase as the examination event progresses. Figures 4; references 17: 15 Russian, 2 Western.

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UDC 611.813.1-013-089.84-031:611.811]-08:616.831-001]-092.9:599.323.4

**Homotopic Transplantation of Embryonal Neocortical Tissue into Adult Brain-Injured Rats**

18400241a Leningrad *ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII in Russian Vol 93, No 12, Dec 87 (manuscript received 3 Mar 87) pp 5-11*

[Article by G.P. Obukhova, V.V. Senatorov, and G.A. Vartanyan, Physiological Department imeni I.P. Pavlov, Scientific Research Institute of Experimental Medicine, USSR Academy of Medical Sciences, Leningrad]

[Abstract] Histological and histochemical studies were conducted on the fate of neocortical grafts obtained from 18-day old Wistar rats following homotopic transplantation into brain-damaged adult Wistar rats. A 1 mm diameter metal pipette was used in the removal of brain tissue from the adult rats in the somatosensory cortex to a depth of 2-3 mm at coordinates A 4500-5500, L 1000-2000. Grafts of similar volumes (2-3 mm<sup>3</sup>) were introduced immediately after the lesion was induced, or 1 to 28 days later. Histologic studies were performed 2-5 months after transplantation. Successful grafts were demonstrated in 36 of the 43 recipients (86 percent). In 23 of the rats the implant filled the lesion and extended into the lateral ventricle. In general, the most complete filling of the lesion was obtained when transplantation took place 3 or more days after the lesion was induced. Implants introduced within 1 day of the lesion tended to localize in the lateral ventricle, leaving the lesion extant. Histochemical studies involving injection of horseradish peroxidase in a site adjacent to the transplant demonstrated both ante- and retrograde movement of the

enzyme, confirming the histological impression of reciprocal connections. A continuum was evident between the graft and the recipient brain tissue, with no evidence of a glial barrier. These findings, therefore, provide evidence for successful neural transplants and, hopefully,

functional integration. Figures 4; references 25: 5 Russian. 20 Western.

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### Basic Guidelines for Restructuring the Pharmaceutical Service

18400284a Moscow *FARMATSIYA in Russian* Vol 37, No 1, Jan 88 pp 1-8

[Article by A. D. Apazov, Main Pharmaceutical Administration [GAPU], USSR Ministry of Health, Moscow]

[Text] Our country has resolutely started on the road to the restructuring and qualitative rejuvenation of Soviet society in all spheres of political, economic, social, and spiritual life and the intensification of socialist democracy. Positive shifts in the level of public health have been achieved as a result of the systematic accomplishment of the plans of socialist construction, the growth of material and cultural well-being, the conduct of large-scale preventive measures by the state, and the development of health care and medical science.

Transformations have also begun in one of the basic health-care services—the pharmacy, which plays a significant role in the overall picture of treatment and prevention, because more than 90% of all treatment procedures involve the use of drugs.

Current improvements in operations are based on the maximum use of the existing potential in the development of the material base as well as the leading forms and techniques of labor.

A system is being developed in which pharmacy facilities operate in conjunction with medical hygiene units at production enterprises, with public health centers, and with dispensaries, which provides continuity to the work of outpatient polyclinics and pharmacy facilities in terms of improving the drug support provided the public. The number of pharmacies built with funds from production enterprises, kolkhozes, and sovkhoses is expanding.

At the beginning of 1987, more than 30,000 pharmacies—which included 13,800 rural facilities—provided drugs for the public. For the public's convenience, more than 5,300 category I pharmacy stations have been set up at polyclinics, and more than 86,000 category II stations have been set up at paramedical-obstetrics centers. The pharmacy system has been brought up to standards in many union and autonomous republics, krais, and oblasts.

A total of 504 mobile units provide drugs to people at remote population points and people who work on the range at livestock breeding facilities. In large-scale agricultural operations, pharmacy workers make more than 80,000 trips annually all the way to field camps and to crews and locations where agricultural workers are concentrated.

In the past five years, the volume of pharmacy furniture and equipment supplied has increased by a factor of 1.5, which has facilitated improved working conditions and the growth of labor productivity. Floor space in pharmacy warehouses has grown by more than a third.

Drugs that are either domestically produced or imported for our health-care needs have grown by a factor of more than 1.4. Deliveries of a number of medicines for the treatment of cardiovascular diseases have increased (by 47%), as have deliveries of antibiotics (by 73.4%), including polysynthetic antibiotics (which have increased by a factor of 2.8). Deliveries of preparations used in psycho-neurological practice have grown by a factor of almost 2; and pain relievers and antipyretics—as well as blood substitutes, sulfanilamides, certain enzymatic preparations, and a number of other groups of drugs—have grown by half. Industry has mastered the production of a whole series of new, highly effective preparations such as clofelin, pantogam, pyracetam, carminomycin, methotrexate, chlozepide, riboxin, prolotione—more than 200 in all. A considerable amount of work has been done to expand procurement of raw materials for drugs. The system of facilities in the USSR Ministry of Health has accumulated a total of 280 tons of medicinal-plant raw materials.

The output of the pharmaceutical enterprises of the pharmacy administrations has grown by 14.5 million rubles, and the output of ready-for-use drugs, by 69 million units.

In order to improve the management and organization of the supply of medical preparations, a complex of inter-related jobs performed by a subsystem of the GAPU automated management system for the managing drug supply and for projecting financial and accounting indicators is in place in the industry and is now functioning (jobs such as tabulating and processing the drug needs declared by the union republic health ministries, keeping track of the funds allocated for drugs, monitoring deliveries of medical products, keeping track of surplus stocks of medical preparations and redistributing them when pharmacy administrations request them, keeping track of stocks of drugs by specific nomenclature, and planning the sale of medications and medical products). The complex of jobs is completely in place at union and republic levels (in the RSFSR and LaSSR). It has made it possible to improve the quality of orders for drugs, to obtain quarterly data on the fulfillment of contracts between plants and suppliers, and to redistribute drug stocks among pharmacy administrations when an additional need arises for them. Only by means of centralized redistribution of stocks are roughly 200 types of medications worth upwards of 5-6 million rubles brought into the treatment process annually. A complex of measures has been put into place for further improvement in projecting medicinal needs, distributing drugs efficiently, and monitoring their use.

The leading scientific-research institutes of the USSR Academy of Medical Sciences, of the USSR Ministry of Health, and of the union republic health ministries are being enlisted for this work. Commissions for projecting needs and for distributing medications and monitoring their use have been set up at health-care agencies and facilities in republics, krais, oblasts, cities, and rural areas, which has made it possible to make an intelligent board-level decision on issues affecting the trends and use of drug stocks.

A system is being created that informs practicing physicians of the availability and arrival of drugs in pharmacy facilities. To that end, nearly 4,000 pharmaceutical information offices have been set up in large polyclinics and hospitals, where physicians can obtain the information they need on drugs and other pharmaceutical data. An information service is also being developed for the public. Automated information bureaus have been created in the UkSSR and the BSSR and in a number of regions of the Russian Federation.

Training of pharmaceutical personnel to staff pharmacy facilities has been expanded.

Pharmaceutical departments or institutes have been opened in all the union republics, which makes it possible for them to prepare their own ethnic personnel.

However, along with the positive trends in the pharmacy service, there are widespread negative phenomena.

They involve, first of all, the drug-need projections. At present, drug-consumption projections are compiled primarily on the basis of the fallacious method of "starting with the existing level"; projections for preparations in short supply are based on the principle "the more the better." Often, the role of the commissions for projecting needs and of the principal specialists amounts to merely confirming the figures presented by the pharmacy administrations. This has led to a situation in which projections for the sale of medications are met at levels of 103-107%, with an average of 80-83 of the pharmacy administrations' drug requests being met; and all the while, above-norm stocks of medicines worth tens and hundreds of millions of rubles pile up in the pharmacy facilities. Scores of medical services end up short of needed preparations.

Those who studied the supply system found that pharmacy facilities in practically every region of our country lack preparations allocated entirely on the basis of their orders. Pharmacies in virtually every administrative area periodically deny the public and treatment facilities preparations such as almagel, xanthinol nicotinate, nootropyl, cinnarizine, caphiol, and vitamin preparations.

Many of the groundless denials of drugs to the public or to treatment facilities are linked to serious organizational deficiencies and to individual pharmacy workers not doing their professional duties. To this day, priority

and mandatory care of disabled veterans and other veterans of World War II has not been set up in a number of places. Stocks of medications used for this purpose are established arbitrarily, without any regard for diagnoses or actual consumption (in the Amur and Moscow oblasts, the Primorye kray, and the UzSSR, to name some).

Serious deficiencies also exist in the drug assistance provided to children and to patients at obstetrics facilities, and these groups are not being given their priority supply. During the fourth quarter of 1986 and the first quarter of 1987, for example, the central pharmacy warehouse of the Estonian SSR did not supply its children's and obstetrics treatment facilities with as much as 50% of the preparations they needed. A similar situation exists in other administrative territories.

Problems in the drug assistance for disabled veterans of World War II, women, and children are due, to a large extent, to the absence of permanent, systematic, coordinated work by the pharmacy facilities and the treatment facilities and to the pharmacy service not attending to this important question.

Public complaints about the absence of drugs or the difficulties in obtaining them are not always associated with insufficient production. The fact that the overwhelming majority of citizens who have addressed written and oral claims to the USSR Ministry of Health are then supplied with medications, based on local stocks, indicates both a lack of motivation on the part of local health-care and pharmacy-administration agencies to analyze the problems that give rise to the complaints and an inability to deal with certain facts of the matter and to work unremittingly to improve the management of drug assistance for the public.

This has led primarily to a considerable growth in recent years in the number of complaints by the public to the GABU of the USSR Ministry of Health about the impossibility of getting drugs.

One possible reason for the poor quality of the work that is being done in determining drug needs involves the sharp fluctuations in the volumes of requested quantities (by more than 20%) that constitute 40-50% of the total amount of product descriptions in the orders placed by the health ministries of the AzSSR, the MSSR, and the TaSSR and by the health-care agencies of Moscow.

Drug-need miscalculations, which lately are not decreasing in number, and the failure to take timely measures to sell drugs and effect expeditious delivery of them to pharmacy and treatment facilities and to manipulate their stocks lead to hoarding in the pharmacy system and, as a result, to the financial instability of pharmacy administrations.



In the beginning of 1987, drug stocks at the GAPUs of the health ministries of the RSFSR and the Georgian, Tadzik, Turkmen, and other union republics were above-norm by more than 20%, in connection with which many kray and oblast pharmacy administrations were unable to pay and could not, in a timely fashion, settle accounts with suppliers for products that had been shipped.

Unproductive losses due to the write-off of drugs whose expiration dates have passed continue to remain high. In 1986, for the USSR pharmacy system, they represented 1,906,000 rubles—which included 1,275,000 rubles for the RSFSR, 267,000 for the UkSSR, 39,000 for the AzSSR, and 68,000 for the KaSSR. The careless attitude of individual pharmacy workers toward their duties led to the write-off in 1986 of imported drugs in the RSFSR worth 150,000 rubles, some 15,000 of which were in Moscow. Imported drugs have been written off in oblasts such as Vologoda and Gorky and in union republics.

Shortages and losses of commodity stocks that have not been written off the balance have grown. In 1985, for example, they accounted for 2,080,000 rubles, and in 1986, some 2,823,000 rubles—which included 2,079,000 rubles for the RSFSR, 486,000 for the GSSR, and 122,000 for the TuSSR.

The administrators of the pharmacy services of the union republics must be more zealous in using the state monetary funds and drug stocks at their disposal.

Criticism is justified when pharmaceutical science proposes complex methods, without any software for computer calculations, to project needs. The simplest methods, however—based on data involving number of patients, nomenclature of the preparations that are being used, and length of treatment—are often not used, particularly for specific groups of preparations.

Directly associated with projecting needs are questions involving drug information operations. For now, the pharmaceutical information service is an instrument used to correct supply shortages of drugs, but it should create a demand among physicians for drugs and provide them with needed information.

The above-mentioned deficiencies testify to the absence of the information needed by sector specialists and the lack of public advertisements, as well as to poor administration replacing day-to-day coordination between pharmacists and physicians in determining how to efficiently use the existing stocks of drugs. The work of many subunits of the pharmaceutical information service is not linked closely enough to the projection of drug needs and the study of the demand for them.

Working with the medical field will also require real changes. Right now, the medical field dictates delivery dates and volumes and drug nomenclature to us. They

require five-year need-projections and projections for the current year from us, and yet they do not tell us what the chances are of our requests being fulfilled. In addition, some pharmacy administrations, in violation of agreed upon regulations, are controlled by production enterprises, and they agree to transfers of medicinal supplies; or they receive the supplies above the existing need, by-passing the GAPU of the USSR Ministry of Health (the capital holder), and refuse earmarked funds.

To this day, some pharmacy administrations have not effected unconditional fulfillment of the requirements of the May 12, 1986, resolution of the CPSS Central Committee and the USSR Council of Ministers, "Measures for Radically Raising the Quality of Production," in the section that deals with improving the quality control of products when they are received from suppliers.

Efficiency in the management of drug supply at all levels is of particular importance right now.

Today's system of supply must ensure expeditious response to changes in the drug needs of health care. The first steps in that direction have already been taken at the highest level. The most critical issues involving the supply of drugs (such as digoxin, diphenin, dicaine, euphillin for injection, analgin for injection, nitrosorbite, and antibiotics) are being discussed regularly at the level of the USSR ministers of health and medical and microbiological industry. An agreement has been reached with Minmedbioprom on presenting figures annually that depict changes in requests for the next year.

Bilaterally, the restructuring of these relationships is going very slowly. On the one hand, more often than not we do not receive positive answers to our requests. On the other hand, however, the right to insert corrections was hardly used in 1987. Thus, the corrections made by the health ministries of the union republics to the 1988 drug orders were extremely minor, considering the solid reasons they have for increasing orders for many preparations as a result of the introduction in 1988 of free medications for patients with bronchial asthma and children between the ages of 2 and 3, as well as the increase in allocations according to article 10 of the budget (drug acquisition) by more than 500 million rubles (nearly 30%).

Discarding out-of-date and ineffective drugs in a timely fashion and removing them from production will make it possible to rejuvenate the nomenclature of medications and to free production capacities for a more rapid introduction of new, highly effective drugs into production and manufacture. This work must be accelerated and must be done everywhere and persistently, because its results have deteriorated over the period of the eleventh five-year plan (in 1981-85, more than 200 names were eliminated from the register; in 1986-87, only about 50 in all).

A great deal of work remains to be done in orienting production toward the manufacture of medical products only in forms that are ready for use, not to mention in efficient packages and containers. An analysis conducted by the All-Union Scientific Research Institute of Pharmacy has indicated that the proportion of ready-for-use medicinal forms of industrial production does not exceed 65 of the total volume of their distribution out of pharmacies.

Beginning in as early as 1989, we must make it a law that orders must be placed for ready-for-use products in the kinds of containers and packaging that meet the needs of health care and the pharmacy system, regardless of whether they are domestic products or imported; particular attention must be paid to drugs for children of various ages. With the USSR Ministry of the Medical and Microbiological Industry, we must soon jointly upgrade to five years the information we have on the prospects of producing and manufacturing drugs, in order to stabilize all health-care services.

With the whole of the national economy tackling problems associated with intensifying economic accountability [khozyaystvennyy raschet] in all units and making the transition to new methods of management based on self-control, self-reimbursement, and self-financing, a radical restructuring of the system for projecting drug needs is needed. Annual and five-year projections of drug needs must be closely linked, and serving as their basis must be public health forecasts, scientifically based treatment methods, data on the treatment and prevention and epidemiological health measures that are being planned, and a widespread use of computers.

An element of prime importance in the restructuring of the entire projection system is the state order—an instruction to supply the most important types of products, which is a must for an equitable partnership between a center and its enterprises and which is being introduced for the majority of drugs. Next in importance is the transition of the pharmacy service to one with direct links with the suppliers of a given nomenclature. It is very important here to correctly determine the nomenclature, since the independence of enterprises and their transition to self-financing and self-reimbursement will lead to considerable growth in the manufacture of highly profitable drugs, although we must not forget that nearly a third of preparations manufactured by industry is unprofitable. The predominate role in solving the problem of totally satisfying the needs of the public for drugs is played by the USSR Ministry of the Medical and Microbiological Industry, which is the principal supplier of medical products. The task of the pharmacy workers at all levels of administration, from the pharmacy to the USSR Ministry of Health GAPI, is to be more exacting, using all the rights given them by the "Special Conditions of Supply of Medical Products," in order to see that every enterprise-supplier fulfills all the health-care orders without fail.

During the restructuring, the role of the pharmaceutical information service is growing considerably. Its main subdivisions at the oblast, kray, and republic levels must be changed over to economic accountability.

The USSR Ministry of Health is planning to reorganize the All-Union Information Bureau in the All-Union Center for Pharmaceutical Information on the basis of a centralized, computerized sector fund and drug data bank.

A reference and information service that uses state-of-the-art communications, computer technology, and automated management systems must be put in place on a wide basis; this will be a real resource in terms of improving quality and raising the effectiveness of information operations and drug advertisements.

A drug is always expected and required to produce a specific effect without any undesirable side effects. Therefore, the issue of choosing a drug for efficient pharmacotherapy is of special interest. The treating physician must be well acquainted with the drug nomenclature in regional and city pharmacies. For that reason, the directors of treatment-and-prevention facilities must pay particular attention to the information service and must strengthen it with outside physician-consultants, which is something that will have a positive effect on the quality of public medical care. The information service must resolve the question of properly informing physicians of their right to write out a prescription for a drug that is temporarily unavailable. In some regions, physicians have been forbidden to do so, which is unacceptable. Everyone should be perfectly aware of the fact that the physician has the right to write a prescription for any drug that is supplied in our country, assuming the physician has a valid purpose and the documentation is in order. Physicians cannot write prescriptions for drugs whose use the USSR Ministry of Health does not permit in medical practice.

It should be kept in mind that, by and large, the success of treatment depends on teamwork between physicians and druggists, which is built on mutual respect and trust.

In places, however, health-care units and pharmacy administrations are not taking the necessary measures to alter treatment tactics according to existing drug resources and the appearance of new preparations so that medications that are in limited supply can be used efficiently. In 1986, of the total range of drugs available to the GSSR, physicians in the republic prescribed, on average, 15% domestic and 45% imported drugs.

The information service has the crucial task of developing and putting in place the criteria for attracting physicians to the notion of increasing the effectiveness of the use of the existing assortment of drugs, and for this, the potential of social orders should be used in a more active fashion for the development of applied programs by scientific research and educational institutes.

The material and technical base of the pharmacy service must be strengthened considerably if all the problems associated with the improvement of drug support for the public are to be solved.

The basic guidelines for the development of health care call for expanding and strengthening the material base of pharmacy facilities considerably and bringing the number of pharmacies and pharmacy warehouses and the warehouse floor space up to standards by the year 2000.

Building and reequipping pharmacy facilities requires wider use of the funds of enterprises and agriculture. The funds of several enterprises or organizations must be pooled in the construction. The practice of building outpatient treatment clinics in the same complex with pharmacies and apartments for medical and pharmaceutical workers will be continued. Nearly 2,000 such complexes will be built between 1988 and 1990. Pharmacy facilities will be reequipped with modern equipment, instruments, furniture, and inventory.

The development of the material base of the pharmacy service must be balanced with the development of all the health-care services. The USSR Ministry of Health GABU must, in the near future, develop interrelated norms for providing the public with medical care and drugs. This should include coordinating the capacities of the pharmacy facilities with those of medical facilities, after norms have been established for providing warehousing services. Regional social and economic development programs must provide plans for the growth and strengthening of the material-and-technical base of pharmacy facilities.

The most important thing in the strengthening of the material base of the pharmacy service is the creation of highly mechanized, automated warehouse complexes in all administrative territories. The primary efforts of the organizations of the pharmacy administrations must be directed to this.

This is a priority task because, in the context of a fuller satisfaction of drug needs, warehousing services—which lags farther behind than any other component in our system—is an obstacle to the day-to-day management of supply to treatment-and-prevention facilities and pharmacy facilities.

There is an urgent need not only for radical changes in the style and methods of managing the sector and in organizing the production operations of pharmacy facilities, but also for a restructuring and improvement of the economic mechanism of the pharmacy services.

All the changes that are being proposed in the pharmacy system must rest on intensifying the consultation and information function, i.e., on forming a foundation of drug assistance even at the level of the pharmacy and converting the pharmacy into a medical facility. The pharmacy system, a component part of Soviet health

care, does its work, unlike the other components, on the basis of economic accountability; a restructuring of the economic mechanism of pharmacy facilities is needed. The All-Union Scientific Research Institute of Pharmacy is at present working out the basic conceptual principles of the reform of management and methods of economic operation. The new economic mechanism will provide for an expansion of the independence of pharmacy facilities that is based on developing economic accountability further and making a deeper commitment to it, introducing the principle of self-financing, and increasing the interest in and responsibility for high-quality drug service to the public on the part of every pharmacy worker and the labor force as a whole. The most important proviso of self-financing is that a level of profitability be attained that enables all expenses to be covered by one's own funds. Estimates indicate that the revenues of the pharmacy facilities do not depend entirely on their operation. To a considerable degree, the total they take in is determined by the imperfect nature of the existing order of the pricing of medications and medicinal products. The presence of two prices—wholesale and retail—places the raising of revenues by the pharmacy facilities at the mercy of the constant variation in prices. As a rule, wholesale prices rise, and retail prices have a persistent tendency to fall, which does not correspond to a strengthening of economic accountability in the pharmacy system. Of 1,637 drugs supplied by domestic production, upwards of 250 result in a loss for the pharmacy service, and more than 450 bring no profits. The grant that the state made for their sale in 1986 was nearly 160 million rubles. Drugs sales in 1986 were higher than those in 1980 by 50.4% in wholesale prices, and by 37.4% in retail prices. The profits shown by the pharmacy system for this period dropped from 10% to 3.6

. Therefore, the change-over of pharmacy facilities to a new economic mechanism based on the principles of self-reimbursement and self-financing must be made simultaneously with a radical alteration of the entire pricing system.

Self-financing does not deplete economic accountability. A precise measurement of costs and yields is required for a fuller use of economic accountability. What a collective's labor contribution is to the final result must be more clearly determined. This will make it possible for the pharmacy service to more actively search out resources for improving operational efficiency.

The conversion of enterprises to full economic accountability, self-financing, and self-control also dictates, of necessity, a restructuring of the entire controlling apparatus, which must be accompanied by comprehensive democratization of management, an elevation of the role of working collectives in management, enhancement of the monitoring from below, accountability, and glasnost in economic agencies.

The pharmacy service must change over to a two-tiered system of management in the autonomous republics,

krays, and oblasts; all interrayon offices will be eliminated, and the role of central rayon pharmacies, as the main component in pharmacy facility management, will grow considerably.

Experience strongly suggests the need for a reexamination of the attitude that has developed toward warehousing services, an attitude that is expressed in the underestimation of the value of the wholesale component in the system for managing drug support. In the forthcoming reorganization of oblast, kray, and republic (ASSR) pharmacy managements into Farmatsiya production associations, the pharmacy warehouses must become their basic enterprises.

Restructuring requires a radical shift in the psychology and thinking of people, a reexamination of outdated notions, a new view of oneself and one's position in society, and, above all, an awareness of personal responsibility for the cause one is serving. Existing difficulties in the development of the material-and-technical base, failures in the organization of labor, and unwarranted levelling of wages have given a free-ride mentality to individual specialists, pharmacy facility directors, and pharmacy service organizers who attempt to justify their own passivity and shortcomings at work with "objective" reasons. Without a doubt, there are difficulties, and they are many, but experience shows that much can be done with unusual approaches to management and with initiative. There are plenty of examples of this. The positive experience of a close collaboration between scientific and applied workers of the Ukrainian and Moldavian union republics in the fuller use of scientific potential for solving practical problems must be actively expanded.

The restructuring and the improvements must touch every component of the pharmacy service.

Accomplishing these and other tasks with which the pharmacy workers of the country are faced will make it possible to greatly enhance the quality of the drug support provided to the public and to treatment and prevention facilities.

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**Goals of the Pharmacy Facilities of the AzSSR in the Light of the Resolutions of the 27th CPSU Congress**

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[Article by R. M. Makhmudov, Main Pharmaceutical Administration [GAPU], AzSSR Ministry of Health, Baku]

[Text] Everything in our lives today is influenced profoundly by the ideas put forth in the 27th CPSU Congress. The congress established grand goals in terms of

protecting and strengthening the health of the Soviet people, making the Soviet people more productive, and basically improving the quality of medical care provided to the public.

Carrying out the strategy for accelerating and restructuring all aspects of the life of the society requires lifting the work of all organs of public health-care—including those that provide drug assistance to the public—to a new and higher level of quality.

To accomplish these tasks, it is important to make available to the public all the drugs and services that it needs. In putting the resolutions of the 27th CPSU Congress into practice, the 31st Congress of the Azerbaijan CP and the GAPU of the republic's health ministry are striving in every possible way to expand the system of pharmacy facilities and improve their economic indicators; raise the skill levels, responsibility, and initiative of the workers; and devote more attention to the ideological and moral training of personnel.

Established in 1936, the GAPU of the Ministry of Health of the AzSSR has come a long way. Its predecessor was the Azfarmprom organization, which had been created on the basis of the pharmaceutical warehouse and Galena laboratory of the Institute of Microbiology soon after the victory of Soviet power in Azerbaijan. Azfarmprom became Azgosmedtorg in 1924, and then the Azerbaijan Republic Pharmacy Administration ten years later. Through all the sign changes, this organization supplied treatment facilities and pharmacies in Azerbaijan with medications, surgical instruments, medical stores, and various pharmaceutical goods.

The creation of the GAPU opened a new page in the history of health care in the republic. Measures were taken to provide a network of pharmacies for all the petroleum and producer-plant areas of Baku and the settlements that surrounded the city. Pharmacies and pharmacy stations with a good assortment of medications sprung up deep in the republic.

Pharmacists, graduates of medical polytechnic schools, staffed the pharmacy facilities.

In the prewar years alone, more than 5 million rubles were spend on the construction and organization of the pharmacy system in Azerbaijan. That was a considerable sum of money at the time. Pharmacies in new buildings equipped with new equipment were built in places like Yevlakh, Taz, Shemakha, Zardob, Khachmas, Karyagino, Lerik, and Ali-Bayramly.

During World War II, the GAPU workers—like all other workers in the Soviet Union—spared no efforts for the front and for victory.

As did the druggists in other union republics, the Azerbaijan druggists fought in the ranks of the volunteer Red Army. In the first year of the war alone, more than 300

druggists from AzSSR were called into the ranks of the Red Army as specialists. Many of them—like D.A. Mamedova-Kosmodamianskaya, S. M. Mamdeova, I.P. Akhundov, and M. S. Guseynov—volunteered for the front. These people crossed the fiery paths of war, demonstrating valor, courage, and devotion to the homeland, to which the medals that decorate their chests testify. Graying with the years, they continue to labor with enviable enthusiasm, transferring their rich experience and knowledge to our youth; they are the mentors and veterans of labor, and they carry out important work for society.

A huge expense of drugs, dressings, and other types of medical stores were used in World War II.

During the war, in order to conserve chemical and pharmaceutical preparations that were in short supply, it was decided to make fuller use of the medicinal plants in the country.

The procurement of medicinal herbs was organized in every region of Azerbaijan. A special organization, Lekrastrest, which included workers from treatment and pharmacy facilities and instructors and students from the Azerbaijan Medical Institute, was set up in Baku, with offices, centers, warehouses, and a staff of procurers. Professor I. A. Damirov deserves a great deal of credit for organizing this important business. A. I. Rusatmov and I. I. Ismaylov took an active part in collecting medicinal plants. The local population was of tremendous assistance. In 1943-45 alone, Lekrastrest provided the state with nearly 300 tons of wild medicinal plants. A physiological solution was made from local table salt, and soap from naphthalene paste. The Sheki Silk Combine used a new technology to produce surgical thread. The Lenin Textile Combine in Baku manufactured gauze, and the cotton factory there, absorbent cotton. A new shop for producing endocrine preparations was set up at the meat combine. There was a dire need during the war for preparations used in preserving blood. Citric acid extracted from the juice of the fruit of the wild pomegranate was used to make sodium salt, which was used in hospitals to preserve the blood. That is how the rear helped the front.

After the destruction of Hitler's Germany and imperialist Japan, the GAPU workers continued their industrious efforts to further improve the drug services for the public. As early as 1946, pharmacies and treatment facilities in the oil-producing regions were beginning to receive larger stocks of medications and other medical goods. A system of two work shifts and night duty was organized in the pharmacy facilities of those regions.

In 1952, the interrayeron departments were strengthened in the Nakhichevan ASSR and the Nagorno-Karabakh Autonomous Oblast and in the Lenkoranskiy and Yevlakhskiy rayons; the Baku Interrayeron Department was re-opened.

By as early as 1964, there were 1,580 druggists working in the GAPU system, 614 of them with higher educations. The network of pharmacies continued to grow, and the mechanism for administering them improved. The Baku, Sumgait, and Kirovabad pharmacy administrations were created in the GAPU, as were interrayeron offices for those cities. By 1970, some 2,250 specialists—662 of them with higher educations—served the republic's pharmacy system.

The GAPU system grew even more rapidly during the 9th and 10th five-year plans. The quality of the pharmacy operations was improved even more by differentiating service for various segments of the population, and a number of specialized pharmacies sprung up.

In the recent 11th five-year plan, another giant step forward was made. The GAPU developed—and the republic's health ministry approved—basic guidelines for improving the pharmacy system between 1981 and 1985. The guidelines called for an improvement in the quality of drug-need projections; a strengthening of the material and technical base; the continued expansion of the pharmacy system; efforts to make drug services more accessible to the public, especially in rural areas; the improvement of the quality of the preparation of medications in pharmacies; and the introduction of advanced methods for organizing labor and management.

In 1984, for the first time in the country, a new technique associated with medical service for the public was put into practice by the pharmacies in Baku—the measurement of arterial blood pressure, performed in the central rayon pharmacies by workers who had taken special courses at the republic's Scientific Research Institute of Cardiology.

In order to bring drug assistance to the rural population, the number of category II pharmacy stations at paramedical-obstetrics centers has reached 1,159 just in the last three years. The entire treatment network of the republic has been furnished with category II pharmacy stations.

The pharmacy council, which works in conjunction with scientific societies of druggists and pharmacologists in the republic, helps raise the quality of work. At meetings across the republic with representatives of local party and Soviet organs, the pharmacy council uncovers errors and deficiencies and points out ways to eliminate them. All these measures have helped to improve drug service and supply for the public and bring about a radical renovation and expansion of the material and technical base of the pharmacy facilities in these regions.

Using the most recent achievements of science in day-to-day practice is of great importance. The 1st and 2nd congresses of Azerbaijan druggists have been held (in 1976 and 1983). A far-reaching effect among pharmacy workers in the republic has been registered by the 1984 All-Union conference, "Contemporary Developmental Aspects and Evaluation of Drug Forms."

International ties are growing. Ukrainian specialists have rendered some practical help in organizing the operation of budget pharmacies [budzhetnyye apteki]; Belorussian specialists, in organizing an information service; and Lithuanian specialists, in designing interiors.

The subsequent performance of these tasks in the interests of the health of working people has made it possible for the GAPU workforce to handle difficult problems and, in a number of cases, exceed plans by a considerable amount. Instead of the projected 30 new pharmacies, 43 have been opened in the republic, 20 of which are in rural areas. Fifty-six pharmacies—instead of the 50 that were called for in the plans—have been moved to new premises with larger production areas.

New construction is under way in the Lenkoranskiy, Masallinskiy, and Dzhalilabadskiy rayons, with renovation being done for half of the existing pharmacies in rayon centers and rural areas.

An interrayon office has been set up in Sheki to supply drugs on a day-to-day basis to six mining regions. The Chaga children's pharmacy was built here in the space of a month.

Much is being done in Sumgait, where the production areas of five pharmacies and a warehouse have been renovated and expanded and where special pharmacies—such as the Aybolit children's pharmacy and the Gornyy Tsvetok herbal pharmacy—and a central city pharmacy, with a reference and information center, have been set up.

An old city—the Baku fort, Icheri Shekher—is graced with the herbal pharmacy Banovsha, which is combined with the pharmacy museum of Azerbaijan. Three pharmacies—including one that is combined with a testing and analysis laboratory—have been put in operation in areas with new housing developments in the republic's capital.

The pharmacy system has undergone particularly intensive development in the past three years. Central rayon pharmacies have been built in the Agdzhabedinskiy, Agdamskiy, Ismailinskiy, Saatlinskiy, Sabirabadskiy, Pushinskiy, Zakatalskiy, Yevlakhskiy, and Lerikskiy rayons of the republic. A press has been set up at the GAPU central pharmacy center to provide day-to-day systematic assistance to subdepartmental pharmacy facilities. A great many new pharmacies are under construction everywhere, and existing pharmacies are being renovated. Five pharmacies are under construction in Baku alone.

A great deal of care has been given to the maintenance of pharmacy facilities. Some 2,446,00 rubles were spent on major and minor repairs during the five-year plan. Construction units that perform repairs have been set up at the central pharmacy center, in the Baku Pharmacy

Administration, and at the Lenkoranskiy Interrayon Office, thanks to the great amount of assistance given by the republic's health ministry.

The pharmacy system has been reorganized and expanded considerably. If cost-accounting pharmacies numbered 614—232 of which were rural pharmacies—in 1981, the number grew to 747 (252 rural) in five years. At present, the number of pharmacies is up to 765. Their structure has improved considerably. In particular, work has been completed on the development of a unified system for supplying hospital patients through a system of cost-accounting pharmacies—33 interhospital pharmacies and 78 hospital pharmacies. Moreover, special pharmacies have won the recognition of the public: six children's pharmacies and seven herbal pharmacies. Also providing drug assistance to the public are 185 category I pharmacy stations; 1,272 category II stations; 114 pharmacy stands [kiosky]; and 18 pharmacy stores [magaziny].

Commodity turnover is an important economic indicator of the activity of pharmacy facilities. The five-year plan was fulfilled by September 15, 1985. The greatest growth was noted over the last three years. Commodity turnover accounted for 52.4 million rubles in 1985, as opposed to 40.5 million in 1982. The per capita commodity turnover in the republic grew by 1.6 rubles, and the average per capita consumption of medications grew by 1.3 rubles.

In 1986, the GAPU set up a plan for a retail commodity turnover of 32,860,000 rubles (a growth of 10%, as compared with the previous year).

In eleven months, 102.8% of the plan was met, including 100.3% of the retail plan. The annual commodity turnover plan was fulfilled by December 24, 1986.

In the same year, the GAPU did a great deal of work to enhance the monitoring of the proper use by the republic's treatment-and-prevention facilities of budget allocations for the acquisition of medications and dressings.

The question of using budget funds was examined by the board of the Ministry of Health and the GAPU Pharmacy Council.

As a result of measures that were taken, there is competent use of earmarked allocations for the first time in the last 15 years.

The volume of drug assistance provided to the public and to the republic's treatment and prevention facilities has grown considerably in recent years.

A central role in the drug assistance provided to the public and to the republic's treatment and prevention facilities is played by proper determination of needs. Compiling requests for medical products takes into account the future of the growth of medical assistance for

the public, data on the dynamics of consumption of medications in recent years, the findings of expert evaluations, and other factors that affect the consumption of medications.

Special significance is attached to drug assistance for children's and maternity facilities. Forty pharmacies supply such facilities in the republic. Additional indices for medications in limited supply have been developed for treatment and prevention facilities of this kind. Special care is taken to give priority to maternity homes, premature infant departments, and children's hospitals and to fully meet their needs for medications.

Procurement of medicinal plants is of great importance. The quotas in assortment and volume of raw materials procured from medicinal plants have been fulfilled and exceeded for the fourth year in a row. The cultivation of medicinal plants is receiving a great deal of attention. At present, subsidiary farms for growing medicinal plants have been set up in the Khanlarskiy, Kubinskiy, Agdamskiy, Tauzskiy, Kutkashenskiy, and Masallinskiy rayons.

Much has been done to strengthen the material and technical base of the pharmacy warehouses of the republic and to provide pharmacy facilities with transportation.

Large-scale measures designed to improve the drug service for rural workers were recently incorporated into GAPU operations. New pharmacies have been opened, and 29 moved to new, well-equipped buildings. In large-scale agricultural campaigns, pharmacy and medical personnel provide services to workers right in the camps.

In the cities of the republic, nearly 40 pharmacies located near specialized treatment and prevention facilities are partially specialized in order to improve the provision of medications to ambulatory patients with diabetes, oncological diseases, and psychoneurological diseases. Expanding the system of fee-based services, workers of large cost-accounting pharmacies have set up centers where items used in patient care can be rented.

GAPU workers are making a great effort to improve the reference and information service. In the five-year plan just past, 36 pharmaceutical information offices were opened, which is three times as many as called for by plan. All the existing offices have been certified. A reference and information center, with modern equipment that includes the 003 special export equipment [oborudovaniye spetsvyvoza 003], has been set up at pharmacy No. 259 in the republic. Special attention is being devoted to incorporating new drugs into medical practice on a day-to-day basis. Chief specialists of the Ministry of Health are helping to distribute new preparations among the base treatment and prevention facilities and pharmacy facilities.

The laboratory service has made substantial advances during the time it has functioned as part of GAPU. In recent years, new methods of analysis have been introduced and mobile laboratories provided. The central testing and analysis laboratory and the laboratories of the Sumgait Interrayon Office and the Baku City Pharmacy Administration have moved to new locations; the facilities of the testing and analysis laboratory in the Nagorno-Karabakh Autonomous Oblast have been repaired; and a testing and analysis laboratory has been set up in the Sheki Interrayon Office. Further improvement is planned for laboratory services, and a vivarium will be set up at the GAPU central testing and analysis laboratory.

The automated management system "Accounting for the Movement of Medications in the Pharmacy System" has been put into operation in three divisions of the GAPU central pharmacy center, and the record-keeping of the movement of drugs has been mechanized in the Nakhi-chevan, Nagorno-Karabakh, and Sheki interrasyon offices.

The GAPU is holding audience with citizens on various issues. The audience is held all week long, at a time convenient for the public. Steady attention is being devoted to letters written by working people, and, consequently, the number of referrals and complaints to GAPU and to other organizations was cut in half over the last five-year plan.

An entire set of measures was aimed at improving the skills of personnel and at making proper job placements. Pharmacy workers have begun to take a more active part in the "Best in Your Profession" competitions and in socialist competitions.

In management, work is being done to strengthen socialist law and to amplify its influence on the results of economic activity. Increasingly, officials are being held responsible for the observance of state and contractual regulations, labor legislation, and laws that protect socialist property and fight mismanagement and waste. Workers are being given better material and moral incentives that are based on the end results of their labor.

Work teams and collective (team) economic responsibility are being introduced in the pharmacies.

The GAPU workers have been successful in the All-Union Socialist Competition since 1983, gaining prize-winning finishes and money prizes for their work in the fourth quarter of 1983, in the second quarter of 1984, and in the second, third, and fourth quarters of 1985. Awarded a money prize totalling 16,570 rubles in the second quarter of 1985, the workers unanimously voted to transfer the money to the Soviet Peace Fund. Pharmacy workers in the republic have transferred great sums to the fund for assisting victims of the disaster at the Chernobyl AES [nuclear power plant].

In five years, the GAPI workers have not only improved, but have also grown in number. By the beginning of 1986, the number of workers in the GAPI system had increased to 6668 from 5637 in 1981. At the present time, 1,361 pharmacists [provizory] and 2,408 druggists [farmatsevy] work in the system.

An order of the Supreme Soviet of the republic created the elevated title of "Honored Pharmacist of the Republic." In 1986, ten workers were awarded orders and medals of the USSR, two pharmacists were conferred the title "Honored Health Care Worker of the AzSSR," four were given the Certificate of Honor of the Presidium of the Supreme Soviet of AzSSR, and ten workers received the "Outstanding Health Care Worker" award.

The CPSU Central Committee, the Council of Ministers, and the All-Union Central Council of Trade Unions have issued a resolution that provides for raising wages of health-care and social workers, in order to enhance the interest health-care workers have in the efficiency and quality of their work. The wage increase called for averages 35.6%. The introduction begun in November 1987 of new working conditions will be completed in November 1991.

At the same time, the Azerbaijan GAPI still has unresolved problems, and all the resources for timely and qualitative improvement of drug service to the public and to treatment-and-prevention facilities have yet to be found.

Thus, although the goals of the resolution have been met, the republic has only half of the norm of warehouse space, which makes it quite difficult to supply pharmacy and treatment-and-prevention facilities regularly and to preserve drugs and medical items.

Ensuring timely and qualitative supply to pharmacy and treatment-and-prevention facilities is directly linked to the solution of many problems associated with the development of the material and technical base of pharmacy warehouses. The central pharmacy center of the GAPI of the republic's health ministry, which supplies the pharmacy facilities in Baku and all the interrayon offices of the republic, was built in 1956 and was designed for an annual commodity turnover of 6 million rubles. Its turnover at present, however, is more than 40 million rubles. Which means that warehouse space must accommodate more than 6.5 times the norm.

In spite of the measures taken to improve the material and technical bases of hospital pharmacies transferred to the jurisdiction of the GAPI, many of those pharmacies are poorly furnished and equipped.

In the 12th five-year plan, pharmacy workers in Azerbaijan are faced with tasks that are considerable and important. The GAPI must be reorganized in such a

way that the three-tiered structure of management is eliminated, which will make it possible to dramatically improve the level of management of the pharmacy facilities in the republic. Some 30 new pharmacies are slated to open, 27 of them in rural areas, and 50 pharmacies will be moved to new premises.

In accordance with a five-year program, annual commodity turnover is scheduled to increase by more than 10 million rubles.

State-of-the-art forms of labor organization will be further developed. Plans call for the creation of ten pharmaceutical information offices and two reference and information centers.

The workers of the GAPI of the republic's health ministry have, since the first days of the 12th five-year plan, taken an active part in the restructuring being carried out by the party and have persistently strived to increase their own contribution to the realization of the strategy developed by the party for accelerating the social and economic growth of the country. Their main goal is to improve the quality of the drug assistance provided to the people in the republic and to strive to strengthen every individual's health and ability to work.

The pharmaceutical workers of the republic are devoting all their efforts and knowledge, all their experience and professional skills to further improving the protection of the health of the Soviet people.

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### **Focus of Medical Training Shifts to General Practice**

18400304 Moscow SOVETSKAYA ROSSIYA in Russian 29 Mar 88 p 2

[Interview with I. Denisov, USSR deputy minister of health, conducted by M. Aleksandrov: "Physician's Examination"; first three paragraphs appear in bold in source and are an introduction to the article]

[Text] Every year, thousands of graduates of higher medical institutions receive their physician's certification and an assignment to work at a hospital, polyclinic, sanatorium, or children's facility. But are they always ready to work on their own, to be entrusted with the health, fate, and lives of people? A conversation at the recently held meeting of the board of the USSR Ministry of Health touched on that.

The situation today has gotten rather complex. Over the past 20 years, the number of physicians in the country has grown by 600,000. In some regions and in many large cities, there are so many specialists with higher medical education that not all of them can find work in their specialty. But the number of specialists being produced



by the institutes has not, unfortunately, meant improved quality of medical service. Some of these graduates are unable to perform the simplest operation, deliver babies, or give first aid.

After the meeting, our correspondent met with the USSR deputy minister of health, I. Denisov.

Much has been done recently to improve the selection of future physicians. The percentage of students with work experience in medical facilities has grown considerably, many institutes are setting up clubs of young medical personnel, and other forms of professional orientation of entrants are being sought.

The training process itself, however, is still changing very slowly. More often than not, emphasis is placed on theoretical aspects, while practical knowledge and skills fade into the background, as it were.

Before, the demands made of the students were few, and enrolling into an institute usually guaranteed graduation. That now-rescinded inflexible system of producing graduates did not allow the heads of higher institutions to dismiss negligent students, and it forced them to grant physician's certificates to people who had no sense of direction in medicine.

A recently conducted certification of several medical institutes in the country led to some less than consoling results. Competency commissions reached the conclusion that none of the institutes meet requirements and that some, such as the Bashkir and North Osetian institutes, should simply be closed, because neither the level of instruction nor their material and technical base ensures that qualified physicians will be produced.

All too often, unfortunately, seniority and the desire to have one's own "personal" higher education institution still hold sway over the interests of the state. Would it be worth creating a medical institute branch in a virtually barren spot, in Kirov, for example, if the Perm Institute, which has rich traditions and a qualified staff of professors and instructors, could thoroughly handle training students from the neighboring oblast?

Notwithstanding the opinions of specialists, however, the decision was nevertheless made to open the branch, and to this day the branch is catastrophically short of good instructors and training equipment. How can one expect quality preparation of students under such conditions?

To change the situation, we need new approaches. Recently, nearly 1,500 outdated instructions were abolished or reexamined. More independence was given to medical institutes, the overwhelming majority of which have now been moved from under union authority to republic authority. But increasing their independence and expanding the authority of the directors of the institutes also presumes a strict demand for results. In

the future, the USSR Ministry of Health and the USSR State Committee for Public Education [Goskomitet SSSR po narodnomy obrazovaniyu] will jointly conduct certification of higher education institutions, identify weak spots in the training process, and keep an eye on the quality of the training of future physicians.

A training and methodology association has been set up and is now based at the First Moscow Medical Institute imeni I. M. Sechenov. With the aid of a council consisting of the heads of higher medical institutions, the association will develop methodologies and oversee the quality of the training of the students. A new manner of conducting graduation examinations, based on the principle of state inspection, will begin this year—representatives of the practical health-care organizations where the graduates will be working will become full-fledged members of the examination commissions. In the future, a proficiency examination for the rank of specialist will be introduced for medical institute graduates who have worked no less than three years in treatment facilities.

In addition, in their training, today's students will have to take a certifying examination twice—in the second year and in the fifth year—which will serve as a unique filter, sifting out the students who are poorly prepared and who have not assimilated the knowledge and practical skills needed by a physician. Those for whom the examination is beyond their competence will be dismissed from the institutes and transferred to study at mid-level medical schools.

The training program for the medical institutes has been thoroughly reexamined. Now, beginning in the third year, students will do practical work in the clinic on a regular basis. In the sixth year, in the subinternship, we have decided to deny narrow specialization to the majority of students and to begin preparing general practice physicians who, with broad specialization, are knowledgeable in treatment, basic surgery, infectious diseases, and gynecology. Such a physician will no longer be a dispatcher, primarily engaged in making out sick-leave certificates and sending patients to specialists. He will be able to independently solve the majority of problems that arise in his patients. Checking vision and hearing, for example, or performing simple surgery, or giving good dietary advice. That is, he will become a family doctor, who is really needed not only by sick individuals but also by healthy ones.

Of course, we will also, as before, need specialists who have an in-depth knowledge of a given area of medicine. Their numbers, however, will be sharply curtailed with the introduction of the family practice physician. Only 10-15% of the medical institute graduates will have a narrow specialty.

In a word, the measures targeted by the board are aimed at returning the physician's certificate its former authority.

### Slow Production, Poor Quality of Prostheses for Afghanistan Veterans

18400308 Moscow SOVETSKAYA ROSSIYA in Russian 7 Apr 88 p 2

[Article by S. Kosterin, A. Podolskiy, and V. Yudanov: "Without Support: 'Sovetskaya Rossiya' Holds a 'Round-table' Discussion of Urgent Problems of Prosthetics"; taking part in the discussion were V. P. Barybin, deputy minister of social services of the RSFSR; D. D. Venediktov, chairman of the ispolkom of the Union of the Societies of the Red Cross and the Red Crescent of the USSR; Yu. P. Bagayev, chief of the treatment division of the Medical Directorate of the USSR Ministry of Defense; G. I. Pakhtusov, head of Rosprotezhprom; I. G. Razumnov, chief engineer of Rosprotezhprom; N. I. Kondrashen, director of the Central Scientific Research Institute of Prosthetics and Prosthesis Building [TsNIIPP]; A. P. Kuzhekin, deputy science director of TsNIIPP; M. V. Davydov, general director of the Moscow Prosthetic-Orthopedic Production Association; V. V. Kotenko, manager of the medical division of the Moscow Prosthetic-Orthopedic Association; V. M. Zhuravleva, head of the medical division of the Ivanovsk Prosthetic-Orthopedic Association; V. G. Spivak, senior research associate at TsNIIPP; Vladimir Fedulov, combat veteran and "internationalist"; A. V. Deryugin, Hero of the Soviet Union and chairman of the social council of the Moscow Prosthetic-Orthopedic Association; and V. A. Panov, identified as a disabled individual; S. Ya. Chikin, deputy minister of the RSFSR Ministry of Health, led the discussion]

[Abstract] One amputee-veteran returning from Afghanistan claims that, like many other disabled veterans, he waited three months after being fitted for an artificial leg before he got the limb. The leg broke after a year. He has been on crutches for four years since then. Disabled veterans returning from Afghanistan are also said to receive no mobility therapy in the hospital, apart from two to three days on their new artificial limb.

Prostheses are made at the facilities of the Minsobes RSFSR—which has 66 enterprises—while the returning disabled veterans are still hospitalized. The chief of the treatment division of the Medical Directorate of the USSR Ministry of Defense admits that the process of making a prosthesis is long and the quality of the product is poor. The length of time it takes to make a prosthesis, however, has been shortened from four-six months to two-three months.

Although some officials claim that domestic prostheses are designed as well as foreign-made prostheses, the use of materials like stainless steel makes foreign prostheses last longer than Soviet-made prostheses. Foreign prostheses are also said to be more comfortable.

Some suggest better pay for the technicians who design and make the prostheses. Others feel that it is time for the industry to pay more attention to the products that

have been made by individual inventors in the country, who are said to have designed prostheses that, in some cases, are far superior to those being manufactured now.

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### Continuing Problems with Postgraduate Training of Pharmacists

18400283 Moscow FARMATSIYA in Russian Vol 37, No 1, Jan 88 (manuscript received 8 Apr 87) pp 65-67

[Article by I. M. Pertsov, Kharkov Pharmaceutical Institute]

[Abstract] A brief summary is presented of some of the topics covered at the All-Union Teaching Methodology Conference, held in Kharkov on December 18-19, 1986, in relation to postgraduate training of pharmacists in the USSR. In addition, pertinent details are presented from sociological studies conducted by the Faculty of Advanced Training of Pharmacists at the Kharkov Pharmaceutical Institute. It is now generally acknowledged that postgraduate training in pharmacy in the USSR is suffering from ongoing problems stemming from poor organization, indifference and detachment from actual pharmaceutical practice. All too few faculties are involved in providing such training, and the results are often cursory due to the lack of involvement of practicing pharmacists in formulating the course of studies. In addition, the heads of many pharmacies regard postgraduate training as an economic burden and, as a result, curtail opportunities for such training. Finally, the general level of the training programs that are offered remains theoretical with little opportunity for hands-on laboratory experience. References 2 (Russian).

12172

UDC 616.1/.4:331.108.2

### Personnel Profile of Therapeutic Physicians

18400242a Moscow TERAPEVTICHESKIY ARKHIV in Russian Vol 60, No 1, Jan 88 (manuscript received 17 Apr 87) pp 106-110

[Article by Ya. S. Mindlin and O. G. Mkhitarov, 1st Moscow Medical Institute imeni I. M. Sechenov]

[Abstract] Beginning with the early seventies, a survey was conducted on the professional profiles of therapeutic physicians in a program worked out jointly with the USSR Ministry of Health. A special questionnaire was developed to elicit statistical information that would facilitate health planning. The study revealed that the percentage of males in this medical category stood at 12.3 percent; 33.5 percent of the medical personnel in this group fell into the 30-39 years age bracket. Most of the specialists were categorized as district therapeutists (55.8 percent), followed by industrial therapeutists (18.3 percent), and therapeutists (10.6 percent). This breakdown was found applicable to all age groups. The heads of therapeutic departments were generally over 40 years of age (72.5 percent), and 8.9 percent of such positions were held by males. Educational data revealed that 95.9

percent of the therapists had completed studies at a therapeutics faculty. A significant proportion of the therapists held dual appointments, ranging from 26 percent for the entire cohort to 40.7 percent in the case of the hematologists and the pulmonologists. In the course of their professional activity 70.2 percent of the physicians did not change their specialty, and significant mobility was noted in the first ten years of their employment. In addition, 87.4 percent of the therapists had taken postgraduate training. In general, specialization was found to limit mobility, particularly to those employed at hospitals and, to a lesser degree, in polyclinics.

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**Initial Experience With Patient Home Care  
Within Framework of Unconventional Polyclinics**  
18400242b Moscow TERAPEVTICHESKIY ARKHIV  
in Russian Vol 60, No 1, Jan 88 (manuscript received 1  
Oct 87) pp 110-113

[Article by I. A. Baryshev, V. I. Vidmanov, A. N. Malysheva, V. P. Silvestrov, V. N. Surovnikov and V. P. Fedorova, Moscow]

[Abstract] Resurgent interest in patient home care has led to an evaluation of 581 cases managed in this manner over a 4 year period. Assessment of the trial program demonstrated that in addition to psychological advantages for the patient, considerable cost benefits were also derived. The optimal situation requires a daily visit from a physician, as well as 24 h nursing care as indicated. With the current shortage of hospital beds, home care offers a particularly attractive alternative to hospitalization in selective cases. The latter have included patients with bronchopulmonary insufficiencies, ischemic heart disease, hypertension, oncologic patients, aged patients on symptomatic treatment, and patients with chronic nonspecific disorders. The cure rate for the cohort in question was 74.5 percent, while 4.6 percent of the patients failed to show clinical improvement. In an average schedule an assigned physician can cover 5-6 patients per day on the home care program, and a nurse 5-13 cases. In this particular study 9,844 hospital bed days were saved, increasing thereby the availability of hospital beds for cases for which there was no alternative to hospitalization. References 19: 13 Russian, 6 Western.

12172/9274

**Socio-psychological Selection in Professional Training of Pilots**

18400233a Moscow *PSIKHOLOGICHESKIY ZHURNAL* in Russian Vol 9, No 1, Jan-Feb 88 pp 71-74

[Article by V. I. Yevdokimov, Kirovograd]

[Abstract] The role of social and psychological selection in pilot training was discussed and a structure of its organization was proposed. Selection (professional orientation) of high school graduates involved a careful study of the personal background of applicants, the performance and evaluation of medical and psychological tests, interviews by a psychologist or experienced specialists to augment the findings from previous tests and studies to obtain additional information about candidates. Further observations provide more information concerning self-discipline, industriousness, social acumen and ability to command. An overall integrative assessment involves experimental psychological testing, conversations and observations. Ongoing social and psychological assessment during professional training (prolonged selection), involving remanning of flight groups, includes observations over a period of 2-3 months and matching flight group and flight instructor personnel in order to assure their professional and psychological compatibility. References: 9 (Russian).

02791

**Systems Analysis of Informational and Motivational (Semantic and Pragmatic) Components in Decision Making**

18400233b Moscow *PSIKHOLOGICHESKIY ZHURNAL* in Russian Vol 9, No 1, Jan-Feb 88 pp 91-102

[Article by D. N. Menitskiy, Scientific Research Institute of Experimental Medicine, Leningrad]

[Abstract] Systems analysis of psychological processes in decision making in a probability situation showed that selection of optimal or adequate strategies of animal behavior and human activity depends, at all stages, on at least 2 components, informational (or semantic) and motivational (or pragmatic) components. A structural scheme of a decision-making problem with multiple choices was examined and discussed. Conditional probabilities of responses with consideration of the biological and (or) social significance (usefulness) of choices made up a pragmatic matrix which characterizes the spectrum of competing needs (motivations) of an individual. Together with the diagram of the probability space of stimuli, reinforcements and reactions, the semantic matrices define a topology and a probability metric of the subject's semantic and pragmatic space and informational and motivational components of decision making. Figures 3; references 40: 36 Russian; 4 Western.

02791

**Biological Action of 9 GeV Protons and Radioprotective Effect of ATP and AMP on Mouse Cornea Epithelial Cells**

18400243a Moscow *RADIOBIOLOGIYA* in Russian  
Vol 27, No 6, Nov-Dec 87 (manuscript received 24 Sep 86) pp 779-783

[Article by S. V. Vorozhtsova, B. S. Fedorenko, V. N. Andrushchenko and P. N. Yashkin, Institute of Biomedical Problems, USSR Ministry of Health, Moscow]

[Abstract] A study of the relative biological effectiveness of 9 GeV protons and the radioprotective effect of ATP and AMP on development and cytogenetic and cytological aberrations of male mouse cornea epithelial cells involved irradiation of 16-18 g mice with 9 GeV protons and gamma-quanta of  $^{60}\text{Co}$  in 0.25-7.0 Gy doses. Some of the mice received ATP and AMP (phosphoden) intraperitoneally 15 minutes before irradiation, at a dose of 359 mg/kg. Unexposed animals with radioprotectors injected by the same method were control animals. The 9 GeV protons have higher biological effectiveness. Coefficients of relative biological effectiveness for protons at this energy level according to the change of the mitotic index in mouse cornea epithelial cells equaled 1.5  $\pm$  0.2; 1.3  $\pm$  0.2, and 1.0  $\pm$  0.2 after 24, 72 and 120 hours, respectively, after irradiation and equaled 2.0  $\pm$  0.2, 1.5  $\pm$  0.2 and 1.3  $\pm$  0.2 in frequency of formation of aberrant mitoses, decreasing with the increase of length of study. A statistically reliable protective effect of ATP and AMP on the frequency of formation of aberrant mitoses was demonstrated. DMF values for protons determined 24 and 72 hours after irradiation equalled 1.8  $\pm$  0.2 and 1.7  $\pm$  0.2, respectively. Figures 2; references 5 (Russian).

02791

**Morphological Manifestations of Proximate and Remote Effects of  $^{241}\text{Am}$  Inhaled by Dogs**

18400243b Moscow *RADIOBIOLOGIYA* in Russian  
Vol 27, No 6, Nov-Dec 87 (manuscript received 8 Sep 86) pp 796-800

[Article by A. P. Nifatov, Z. I. Kalmykova and L. A. Buldakov, Institute of Biophysics, USSR Ministry of Health, Moscow]

[Abstract] One of the most important pathways of entry of transuranic nuclides into the body is via the lungs. In view of this, experiments were performed on 56 mongrel

dogs of both sexes, weighing 13.5  $\pm$  0.4 kg at 2-4 years of age. Dogs underwent a single inhalation of an aqueous solution of  $^{241}\text{Am}$  at pH 1.5 in quantities of 0.37-137 kBq/kg and, after death, were placed, according to histological findings, into one of three groups: acute, subacute or chronic lesions with the initial level of  $^{241}\text{Am}$  in the body at 101  $\pm$  12, 58  $\pm$  8 and 12  $\pm$  7 kBq/mg of body weight, respectively. Causes of death after acute lesions included fibrous purulent pneumonia and pneumosclerosis. Subacute lesions entailed cirrhosis of the liver and pneumosclerosis. Malignant neoplasms of the skeleton, lungs, liver, and thyroid gland and pneumosclerosis appeared with chronic damage and could be directly related to incorporation of the radionuclide. Specific features of tumors induced by the radionuclide were their predominant location in the vertebrae and the multicentricity of bone tissue lesions. A morphological feature of neoplasms in the lungs and liver was the development of lymphoid cancers. References 10: 9 Russian; 1 Western.

02791

**Radioprotective Effectiveness of Acyl Hydrazones**

18400243c Moscow *RADIOBIOLOGIYA* in Russian Vol 27, No 6, Nov-Dec 87 (manuscript received 5 May 87) pp 843-846

[Article by O. V. Arapov, O. F. Alferova, Ye. I. Levocheskaya and I. I. Krasilnikov, Military Medical Academy imeni S. M. Kirov, Leningrad]

[Abstract] A study of the radioprotective effectiveness of 17 acyl hydrazones of the general formula  $\text{R}_1\text{CONH-N=CHR}_2$  involved experiments on 20 g mongrel white male mice and rats subjected to gamma irradiation. Acyl hydrazones of salicylic and beta-oxynaphthoic aldehydes displayed a pronounced radioprotective effect in both mice and rats, with 40-55 percent survival of animals receiving a 1-10 mg/kg dose of the drug. Toxicity of the hydrazones is low (2 g/kg) in comparison with that of well-known sulfur-containing agents and substituted indolylalkylamines. There was a definite relationship between the radioprotective effectiveness of the drugs and their capacity to bind metal ions. Potent complex-forming hydrazones produced maximum protection while those unable to bind metal ions had no radioprotective effect. References 8: 4 Russian; 4 Western.

02791

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**Fundamental and Applied Aspects of Wound Healing (Scientific Conference, March 1987, Leningrad)**

18400241b Leningrad *ARKHIV ANATOMII, GISTOLOGII I EMBRIOLOGII* in Russian Vol 93, No 12, Dec 87 pp 91-92 .

[Article by V.G. Gololobov]

[Abstract] This conference was organized jointly by the Military Medical Academy imeni S.M. Kirov and the All-Russian Scientific Society of Anatomists, Histologists and Embryologists to cover advances in both basic

research and clinical findings. The conference was opened by professor G.M. Yakovlev, who emphasized the importance of the histogenetic theory of tissue regeneration. In addition to practical clinical and surgical management modalities, the conference also covered such factors the neural component in wound granulation, as well as biochemical correlates of tissue repair. The conferees noted the importance of fundamental studies on differentiation and tissue predetermination, and the need for closer cooperation between basic researchers and clinicians for a better understanding of wound healing.

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